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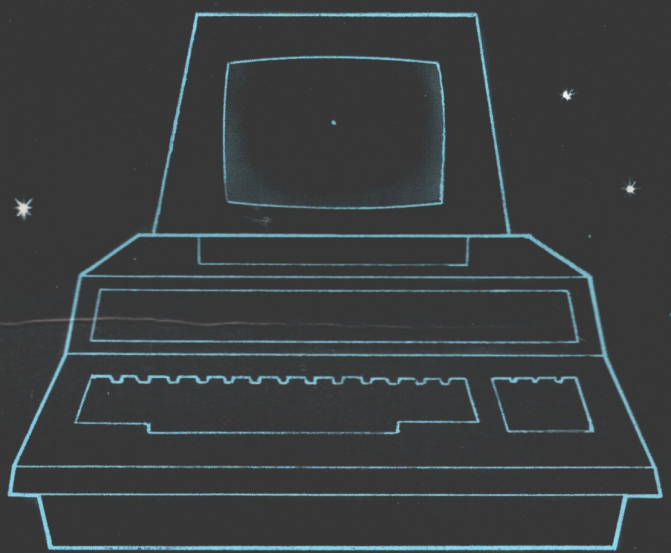
PRINTOUT

All about the PET Computer



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Editorial

We're in a happy mood this issue (but are we not always?). This time though we really have a better-than-usual excuse to celebrate, for this is the eleventh PRINTOUT and thus the first of the second volume. Looking back on our slim first issue and holding it, as one does with family snapshots, against the most recent, which was Number Ten, our lad's rapid growth is apparent. In fact, the total volume adds up to three hundred pages.

Subtracting the advertising, that leaves around 150 pages of solid PET information, which has cost subscribers (the only group certain of every copy) the princely sum of £9.50. Where else, we're bound to ask, can you get a book that size, exclusively devoted to the PET world?

But we're being desperately unfair when we say "subtracting the advertising", for it's our advertisers who helped us through our birth-pangs to the established publication we are today. That's why we'd especially like to ask a favour (albeit one not unfamiliar to you): when you contact them, mention PRINTOUT. It helps them; it helps us; and that means it helps you.

For the future, we'd like especially to suggest you subscribe, rather than depend on the risky business of buying issues as you see them displayed. There are lots of reasons (not the least of which is the number of times we're selling out now), but the biggest currently is that we're likely to be the only definitive source on the growing complexities of Commodore's new Basic 4.0 and DOS chips. The problems these are going to create for older (but still relatively new) PETs and disk units are mind-bending. Add in the increasing number of add-on ROMs, and the situation's really complicated! Stay with us: avoid headaches and save money too!

PRINTOUT, of course, is a PET encyclopaedia in the making. Though we didn't set out to be a "part-work", it's a pattern that's emerging. Which is why we've now produced binders for your back-numbers. More details on those elsewhere in this and future issues. It's also another good reason for subscribing, for we're bound to find ourselves more and more often referring to (but not repeating) items which have appeared in previous issues, as we gradually build the storehouse of information.

And finally, here's an offer and an invitation. We find ourselves growingly in need of reviewers for business software. If you have experience in any particular business field; can write passably well (though we'll add the final polish); and would like to be on our list of reviewers, then drop us a line, telling us about your particular expertise. We'll be happy to hear from you.

T.H.

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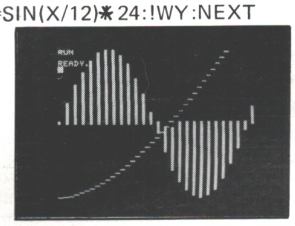
The PicChip is a ROM module which simply plugs into your PET making available immediately over forty new BASIC commands. These commands use BASIC variables as parameters (no PEEKing or POKEing) and enable the graphic possibilities of the PET to be fully exploited - even by beginners! Using an X, Y coordinate system based on an origin specified by program, lines, graphs and drawings of all kinds can be generated on the screen by simple programming. Other commands enable defined areas, or the whole of the screen, to be rolled or shifted up, down, left and right. Images can be stored to and retrieved from any RAM address.

Originally designed for **scientific** and **technical** applications, the PicChip is also being used in **educational projects, games** and **design work** of all kinds. The combination of fast plotting and area manipulation makes the PicChip ideal for the continuous display of real-time data in graphical form.

Just see how easy it is to use PicChip commands: the following examples were all photographed directly from a PET screen.

Picture 1 shows two curves, one drawn in fine-density and one in bar form, produced by two program lines:

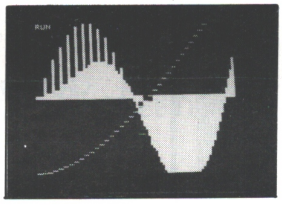
```
10 FOR X=0 TO 39:Y = X↑1.5:!WF:
NEXT
20 Y0=25:FOR X=0TO79 STEP 3:
Y=SIN(X/12)✱24:!WY:NEXT
```



(1)

Picture 2 adds a third program line to plot a function as adjacent bars:

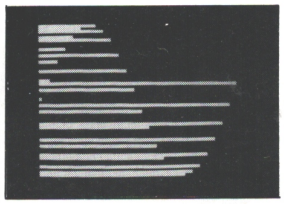
```
30 FOR X = 0 TO 79:Y=SIN(X/12)✱
X/2:!WY:NEXT
```



(2)

If we just take the second program line and change !WY to !WX, the bars are plotted horizontally:

```
20 FOR X = 0 TO 79:Y=SIN(X/12)✱24:
!WX:NEXT
```

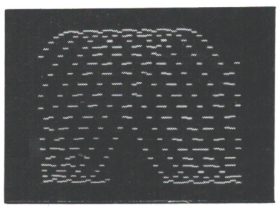


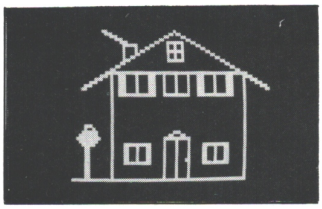
(3)

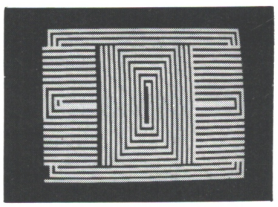
All the other pictures reproduced here were generated by the DEMONSTRATION PROGRAM included in the 20-page Handbook. What we can't show here are the amazing effects produced by shifting or rolling or otherwise manipulating different areas of the screen. There is even a repeat-key function, and commands for reading and setting the cursor position in X,Y co-ordinates.

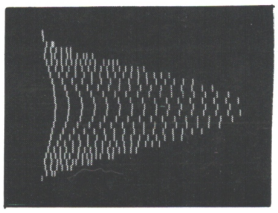
PicChip Functions.

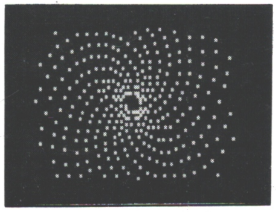
Command	Function
SYS 45056	PicChip On
!RE	Restore screen
!CO	PicChip off
!RP	Repeat-Key on
!RO	Repeat-Key off
!CW	Cursor-position Write
!CR	Cursor-position Read
!AF	Area Fill
!AR	Area Reverse
!AN	Area Normal
!AI	Area Invert
!AS	Area in Shift case
!AU	Area in Unshift case
!AC	Area Case invert
!AF	Screen Fill
!SR	Screen Reverse
!SN	Screen Normal
!SI	Screen Invert
!SS	Screen in Shift case
!SU	Screen in Unshift case
!SC	Screen Case invert
!US	Up Shift
!DS	Down Shift
!LS	Left Shift
!RS	Right Shift
!UR	Up Roll
!DR	Down Roll
!LR	Left Roll
!RR	Right Roll
!WP	Write Point
!EP	Erase Point
!WL	Write Line
!EL	Erase Line
!WC	Write Continuous line
!EC	Erase Continuous line
!WX	Write bar in X axis
!EX	Erase bar in X axis
!WY	Write bar in Y axis
!EY	Erase bar in Y axis
!WF	Write fine Y
!EF	Erase fine Y
!FW	Write fine X
!FE	Erase fine X
!CS	Copy Screen
!PC	Poke Character











The standard PicChip plugs into socket UD4 of the PET, but is also available to fit either of the other two sockets. PicChip is therefore **compatible with other PET ROM packages.** Installation and use are fully described in the handbook.

The PicChip costs just £45 + VAT including a handbook. To buy the handbook separately costs £5 but this may be offset against an eventual purchase of the chip. State required socket when ordering. **10% discount to educational institutions.**

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JCL EPROM BURNERS
An essential device for programmers wishing to incorporate their programs into ROMs. Comes complete with software. Another nice little number from this company is the TURNKEY ROM set, which is suited to business software writers and users. It will load from disk a program as soon as you power up - also features a "BULLET PROOF" input routine. See our catalogue for the details of this versatile little beauty.

BOOKS
Over 15 titles from Prentice Hall International, OSBORNE/McGraw-Hill, BYTE BOOKS, SIGMA, and COMPUTABITS. All the titles have been selected with the PET user in mind, and the range includes books on PASCAL, GRAPHICS, PROGRAMS, IEEE BUS, CIRCUITS, HARDWARE, etc. Don't forget the PET/CBM Personal Computer Guide at £9.25 plus £1.00 p+p.

BASIC 4 and DOS 2 CONVERSION
BASIC 4 gives your new ROM PET all the commands of the new 80 column PETs. DOS 2 goes in your disk drive and is necessary when using BASIC 4 or may be used on its own to get rid of initialisations every time you use a disk. Both sets are priced at £43.70 inc. VAT + 50p P+P each.

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DAYLIGHT ROBBERY?

Readers will be reassured that CURSOR is still coming through from the States, but now at six issues per annum. However, I must take issue with Gavin Sanders when he suggests that Petsoft might have considered a price rise for CURSOR before they discontinued its distribution. Prices over here verge on the indecent and someone is making a huge profit at our expense. Just look at the list below and you'll see what I mean. Calculations based on $2.40 = £1.00 but exclude duty and VAT.

Item	USA price	UK price
Cursor	£18.75	£36.00
VisiCalc	£53.50	£125.00
Blank Disks (10)	£13.12	£25.00
Toolkit	£18.70	£44.00
KRAM	£41.67	£100.00

These are just a random selection and my advice is to buy direct from the States.....it's easier than you think!

John Nuttall,
Southern Users of PET Association,
12 Eastgate Gardens,
Guildford

There are several legitimate reasons why imported goods cost more than in the country of origin, John. Airfreight, import duty and VAT add around 50% to the trade price. There is also an extra link in the chain: the importer who finances, promotes and distributes the product. All in all, we don't think it is unreasonable for American products to be priced here at around 150% of the U.S. price.

Personal Software tell us that the price of PET VisiCalc is $200 in the U.S. At $2.40 that's £83.33. Multiply that by 1.5 and you get £125, which is exactly *what Petsoft are charging. As for diskettes costing £13.12 - our advice would be to steer well clear. The trade price for decent quality 5¼" diskettes is around £19.00 here, so it certainly isn't the dealer who is profiteering.*

The £36 U.K. Cursor subscription included 15% VAT and ten lots of postage and packing. We doubt anyone can make money selling cassettes at £3.13 each by mail order. Cursor is now available through Audiogenic at £21.00 for six.

Happily Toolkit prices are down now that Zynar have bought a share of the manufacturer and are distributing direct.

The KRAM sold here is not the same as that advertised in the U.S. For one thing it works with DOS support. It also has a much better manual. The price here is now £75.

Unless you are sure that the product will never go wrong, and that you will never need support, our advice is to buy from your friendly local dealer.

SON OF POWER FROM PET

I was gratified to see my letter on obtaining power from the PET in the Christmas issue, but unfortunately the message will have been lost, because on the three occasions where I mention the switch-on POKE59411,52 (twice in the text and in the first line of the program) this has been printed as POKE59411,**53.** This POKE switches **off** the motor in new ROM machines!

Peter Sington
New Amberden Hall
Debden Green,
Saffron Walden

There was some method in our madness, Peter. What happened was that when we tested your suggestion, we used OPEN1,1,1. When the file has been opened to write, POKE 59411,53 works, *whereas POKE59411,52 crashes the machine. So the first mention of 59411,53 in your original letter is correct as we printed it, but the others, including the listing should indeed have read POKE59411,52. Now, does anyone have an aspirin?*

MEMORY PROBLEMS

Three months ago my old ROM 8K PET developed a memory fault, necessitating the change of a 6550 RAM chip. Although the memory tests OK when I run the diagnostic tape, strange things have been happening. Two lines become linked and can only be separated by retyping both. Odd characters have changed during a run. What concerns me most is that the chips all run hot. Incidentally I was horrified to discover that the 6550 RAM chips cost £10 each plus fitting from a PET dealer. Is there a cheaper source of supply?

F.H. Mallett
Upper Shoreham Road
Shoreham
West Sussex

Sounds like a RAM fault to us, Mr. Mallett. The fact that the chips are running hot isn't necessarily significant. Indeed, it's usual. Try running the machine code memory test for a long time - perhaps a day. That should locate the source of the trouble. If you are confident enough to replace RAM chips, and it is quite a fiddly job, you should be able to obtain them from one of the big component suppliers. We wouldn't necessarily recommend this as it could invalidate your warranty. However, as Commodore only give a mean 90 days, you will be well out of it with an old ROM machine.

CITY SLICKER

Visiting the research department of a large stockbroker last month, I was intrigued to see several dogeared copies of PRINTOUT lying around. Apparently Inside Trader is keenly scanned by those who follow high technology stocks. I myself have purchased shares in ACT and Commodore, both of which have quadrupled in value. I hope now to be able to buy some of the new Apple stock when it is issued. Thanks for providing such useful information.

C.R.P. Davies
Cambridge Street
London S.W.1.

We are delighted you have done so well, Mr. Davies, and we are stepping up our investigative reporting. Even so, we leave share-tipping to others. On the stock market a lot can happen in the time it takes for PRINTOUT to reach you. There are several brokers who specialise in high technology shares; we can suggest some names if you need them.

A MYSTERY FROM JIM BUTTERFIELD

The program is not intended to have any explanation; you have to run it to find out what it does.

Jim Butterfield
Ontario
Canada

```
100 POKE59468,12:PRINTCHR$(142)
110 S$="TSIUNZSNF!JBSDT"
120 PRINTCHR$(147):P=193
130 FORJ=0TO15:K%=J/4:K=J-2*K%:IFK=0THENK=1
140 FORL=1TO19-K:PRINT" ";:NEXTL
150 K%=K:C=205
160 K%=K%-1:IFK%>0THENGOSUB500:GOTO160
170 PRINTCHR$(P);:P=214+RND(1)*1.1:C=206
180 K=K-1:IFK>0THENGOSUB500:GOTO180
190 PRINT:NEXTJ
200 PRINTTAB(18);"X"
210 PRINTTAB(17)"XXX"
220 PRINTTAB(11);
230 FORJ=1TO15
240 K=J*4:K%=K/15:L=K-K%*15+1
250 PRINTCHR$(ASC(MID$(S$,L))-1);
260 NEXTJ:END
500 IFRND(1)<.1THENPRINTCHR$(215);:RETURN
510 PRINTCHR$(C);:RETURN
```

▷10

"If you want what's best for your PET, choose Commodore software."

Kit Spencer
General Manager
of Commodore Systems
360 Euston Road
London NW1 3BL

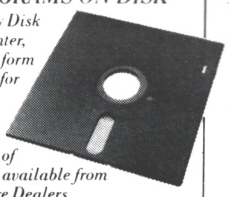
The Commodore PET is Britain's best selling micro-computer, with over 30,000 already installed in a wide range of fields, including Education, Business, Science and Industry.

This has led to a tremendous demand for high quality software.

And Commodore has met this demand by producing a first class range of programs, now available from the nation-wide network of Commodore Dealers.

Commodore's support also includes training courses, a Users' Newsletter and Official Approval for compatible products of other manufacturers who reach agreed standards.

NEW BUSINESS SOFTWARE PROGRAMS ON DISK



Commodore's Floppy Disk Unit and high-speed Printer, combine with the PET to form a complete system (ideal for running a business) for under £2,500.

Commodore also produce a growing range of business software on disk available from Official Business Software Dealers.

Business Information System – COMBIS £150 + VAT

Combis facilitates the storage and instant retrieval of all kinds of company records, from personnel files to mailing lists and printed address labels.

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Comword turns the system into an excellent word processor.

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Over 50 Petpacs of programs are available (mainly on cassette) from Commodore Dealers.

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PET systems are simple to use and any normal advice or assistance you may need can be obtained from Commodore Dealers.

On the other hand, for rapid training on a basic or advanced level, you will certainly be interested in Commodore's intensive 2 and 3 day residential courses. We also run one day general appreciation seminars.

PET USERS' NEWSLETTER

This is Commodore's official method of sharing new information and ideas between the many thousands of PET users. The newsletter is published regularly and for an annual subscription of £10 you can start receiving copies now.

Look out for this sign. It tells you that compatible products of other manufacturers have met with our standards of approval.

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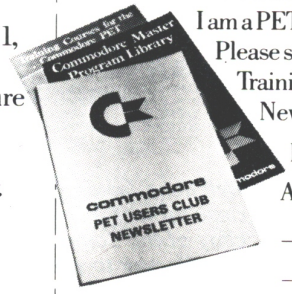

(Tick the appropriate boxes)

To: Commodore Information Centre, 360 Euston Road, London NW1 3BL 01-388 5702

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READ/WRITE

GEERE LAUNCHES 2-PRONGED ATTACK ON PRINTOUT

Gavin's tail-piece headed 'Discovery of the Age' (October issue) made familiar reading. The main omission was, I suspect, that the "discovery" was made while reading the July '80 issue of the Independent PET Users Group Newsletter. The true discoverer was Kevin Viney - after all I wouldn't want Gavin to claim the credit!

It's not like Tommy Turnbull to slip up in print, but it happens to all of us at some time. Let's test his function with the following program:

```
10 DEFFND(X)=INT(LOG(ABS(X)+.001))/LOG(10)
20 FOR I=0 TO 5 STEP 3.23
30PRINTTAB(12-FND(I));I:NEXT
```

Beautifully formatted indeed! Vary the limits and increment in line 20 about zero.

The following function is a little more complex, but will round the pence and align the decimal point:

```
 5 DEFFND(X)=-LEN(STR$(J))+(ABS(J/10)<1)+(J=0)
10 FORI=-12TO12STEP0.001
15 J=INT(I*100+.5)
20 PRINTSPC(12+FND(J));J/100:NEXT
```

Ron Geere,
York Road,
Cove, Farnborough

The user function error in Tommy's original method is caused by a missing pair of brackets. The corrected line would be:

10 DEFFND(X)=INT((LOG(ABS(X)+.001))/LOG(10))

However, Tommy reckons Ron's method is better although rather more complex.

Gavin Sanders replies: "I'd as soon aggravate Geere again as change down to BASIC 1.0! Or sit in a box of poisonous spiders! The fact of the matter is that my informant was a shadowy figure on the South Coast, in a group that used to be connected with IPUG but now deny all knowledge of them. I'm afraid I don't get the IPUG Newsletter though I'm constantly told I am on their circulation list. If Ron would like a good mailing list program, he could always use the one in the last issue of PRINTOUT."

PI IN THE SKY

My 8032 lacks the value of π as a numeric constant. 40 column programs using π list with a dot pattern that can also be accessed as CHR$(255) in normal lower case mode or displayed as π in graphics mode. Unfortunately, programs always crash if run with this display. Is there a routine which could be entered, perhaps as the first line to ascribe the appropriate value to the character so that such programs can be run? Otherwise it appears that I shall have to change the listing throughout to insert an acceptable variable character.

J.A. Tanner,
Tanner & Partners,
Consulting Engineers
Triangle South
Clifton, Bristol

We tackled Commodore who offered the following first line:

1 POKE1042,255:PI=I:?PI

MORE INTELLIGIBLE LISTINGS

One of the problems in rapidly understanding program listings - even your own - is the 'mental gearchange' involved in relating the variables used within the program to the 'real' names of these variables.

Programs are much more understandable if two letter variables are used which relate directly to their use; for example 'SP' for speed, 'QT' for quantity, etc.

Because PET's basic only recognises the first two letters of a variable program, complete words may be used. This can be very useful for demonstrating programs where instant understanding of the listing is required. For example:

```
10 INPUT PARTS
20 INPUT LABOUR
30 DISCOUNT = (PARTS + LABOUR) /3
40 PRINT PARTS + LABOUR
50 PRINT DISCOUNT
60 PRINT PARTS + LABOUR - DISCOUNT
```

The only proviso in the use of complete words for variable names is that no part of the word may contain letters which may be read as one of Basic's reserved words; for example **TOTAL**, **SECOND**, or **FORM** may not be used.

When using REM's to divide blocks within a program I have found the most effective method to be:

```
10 REM*************PROGRAM BLOCK NAME*******
**********************************************
```

REM, plus a full line of asterisks divided by the block name, followed by another screen line of asterisks, less two. This will screen **LIST** as a nice double line block, followed by a single line space. It will list on a printer as a full width line.

Granville Kirkup
Anchor Road,
Aldrich
Walsall

Thanks, Granville, and to all our correspondents. Your letters are a real pleasure to get, read and print whether or not they're with program listings for other readers to try. If you send us a small program, and if you have access to a printer (but only if; don't stop writing just because there's not a printer handy!), then it would help us enormously if you would enclose a listing. Try to keep to 40 characters per line so that reproduction isn't too small; use a reasonably new ribbon if you can, and try not to fold your listings in the envelope. We'd prefer a CBM or similar printer because graphics and similar characters will be correct. We look forward to hearing from you.

LONGEST LINE PRIZE WINNER

Here is my entry for your contest for the longest single BASIC program line. It consists of a program to merge BASIC program lines up to a maximum of 254 bytes (the PET crashes with lines longer than this). The actual entry is line ten of the program which is a single line (not a very useful one, I will admit) that more than fills PET's screen.

James M. Bryant
Church Road
St. Marks, Cheltenham

```
 1 REM          LINE  MERGE                THIS PROGRAM MERGES TWO SUCCESSIVE LINES
OF BASIC PROGRAM IN THE PET.               TO USE  LOAD THIS PROGRAM AND SAVE LINES
60000 ONWARDS ON THE SCREEN, THEN LOAD     THE PROGRAM TO BE MERGED AND APPEND THE
LINES FROM THE SCREEN.
 2 REM"■■■■■■■THE SECOND OF THE TWO LINES SHOULD BE   FOLLOWED BY AN EXTRA LI""■
THE CONSISTING OF A 'REM' STATEMENT ONLY WHICH MUST BE    DELETED WHEN TH""E MER
GE IS COMPLETE.      THE LARGEST MERGED LINE CANNOT CONTAI""N  OVER 254 CHARACTER
S.
 3 REM"■■■■■■■IF A NUMBER OF LINES ARE TO BE MERGED ANEXTRA LINE '0 GOTO60000'""
T MAY BE ADDED TOSIMPLIFY THE RUN INSTRUCTION TO 'RUN'   FROM 'RUN60000'"".
                THE FIRST LINE OF A MERGED PAIR MUSTN'T
 4 REM"■■■■■■■CONTAIN A SINGLE '"" ,'RETURN', 'GOTO', 'IF..THEN', 'ON..GOTO', 'END
', 'STOP',  OR EVEN 'REM' OR 'DATA' UNLESS THE 2ND LINEIS TO BE A PART OF THE REM
 OR DATA      STATEMENT.

 10 RESTORE:RESTORE:RESTORE:RESTORE:RESTORE:RESTORE:RESTORE:RESTORE:RESTORE:REST
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60000 INPUT"LINE NUMBER";A:B=1025:C=B:FORD=1TO100:C=PEEK(C)+256*PEEK(C+1)
60001 IFA<>PEEK(B+2)+256*PEEK(B+3)THENB=C:NEXT:PRINT"NO SUCH LINE":END
60002 Z=PEEK(C)+256*PEEK(C+1)-B:PRINTZ:IFZ>254THENPRINT"BECOMES TOO LONG":END
60003 INPUT"JOIN BY COLON (C), SPACE (S) OR NOTHING (N)";A$
60004 G=-(A$="C")-(A$="S"):F=-32*(A$="S")-58*(A$="C"):IFG=1THENPOKEC-1,F
60005 I=PEEK(C)-5+G:IFI<0THENI=I+256:POKEB+1,PEEK(C+1)-1
60006 POKEB,I:E=PEEK(C)+256*PEEK(C+1):FORD=C-1+GTOE-1:POKED,PEEK(D+5-G):NEXT
60007 PRINT"NOW DELETE DUMMY LINE - AT ONCE!"
```

Well done James. Despite some grumbling from Tommy, who came up with a similar result, we declare you the winner. A copy of the Compsoft Data Management System worth £95 is on its way to you. Our thanks to the lovely Heather Kearsley of Compsoft for providing the prize.

Buy a microcomputer for under £1,000 and you could be on your own!

Unless it's a Commodore PET

Commodore produce Britain's number one microcomputer. But we don't stop there. We also insist on providing comprehensive support throughout our national dealer network.

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Our software range covers hundreds of applications. Business software includes Sales and Purchase Ledgers, Accounting, Stock Control, Payroll, Word Processing and more. In addition over 50 Petpacks are available covering such titles as Strathclyde Basic Tutorial, Assembler Development System, Statistics, plus our Treasure Trove and Arcade series of games.

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POD. 4

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on CBM/PET or Apple

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2. A farmer in Wiltshire compares budgeted and actual expenditure, analyzes transactions and solves numerous other business problems.
3. A Louisiana shipyard manager does inventory pricing, cost estimating, and stability and tonnage calculations.
4. A City financial analyst, who computes and prints trust fund reports for his clients, says, "VisiCalc is paying for itself over and over again. An excellent money maker."
5. A California real estate and financial planner automated much of his work with VisiCalc's powerful features. For example, he has created an array of 13 certificates of deposit with varying base amounts, term periods, and interest rates, with associated calculations for required "break-even" terms and interest rates when current date and available money market rates are entered. Penalties for early withdrawal are applied and gain/loss shown if proceeds reinvested. Daily compounding of interest is provided for.
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7. The financial director of a Newcastle company does his budgeting and planning.
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9. A chemical research scientist keeps weekly budget planning, tax records (income and deductions), medical expenses and personal inventory.
10. An Australian manufacturing firm manager's uses include factory production reports, labour costing, calculation of recent price increases, and "a race horse selection program that is yet only moderately successful."
11. A Swiss retail food store manager uses VisiCalc for profit centre calculations, enabling him to know the net profit of every store on a monthly basis with the input of only three reference numbers.
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15. An electrical engineer does his business plans, balance sheets, cash flow analysis and sales forecasts. Says he likes VisiCalc's "protection from errors and mistakes."
16. An Oregon medical laboratory director does his workload calculations and space forecasting.
17. A New York finance manager does balance sheet forecasting and keeps a five-year income statement.
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20. An executive of a major management consultancy explains how they had used an expensive time-sharing service which tied up a programmer/analyst to create and run the models, so there was always someone between their needs and the final results. "We attempted to duplicate what we had at the service bureau and surprised ourselves that we could do it easily and without specialised programming skills. Now we have evolved far more sophisticated forecasting and modelling tools that go well beyond enything we originally envisaged. These analyses are used by us on behalf of our clients or prospective clients and they help us get more business."
21. A Manchester optician took the hand calculations out of his budgets and sales projections.
22. A senior financial analyst does his balance sheet financial analysis (ratios, rates, yields, etc.) and financial modelling such as profit plans.
23. The president of a New York retail business is using VisiCalc to figure out how he can pay for his personal computer. (He should talk to the guy mentioned in number 4!)
24. The co-owner of a Nuneaton restaurant calculates food costs, bar costs and total operation cost projections.
25. A Massachusetts student is crunching numbers at Harvard Business School with VisiCalc....straight to the head of the class.

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VisiCalc is the award winning program from Personal Software. It handles mathematical and financial forecasting — and solves just about any problem that can be represented in tabular form. Try it at your nearest PET or Apple dealer or send for your copy direct from:

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PET is the trademark of Commodore Systems. Apple is the trademark of Apple Computers.

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[ ] I enclose £125 + VAT for PET/Apple VisiCalc

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.....

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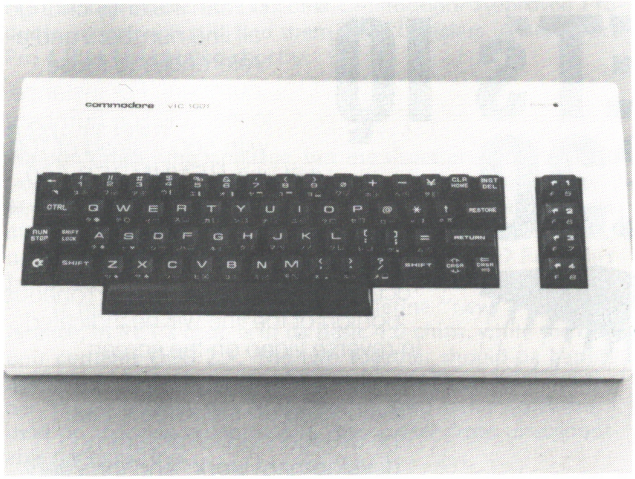
MEET THE MINI PET

Here it is - the first picture of Commodore's bid for the mass computer market, Video Interface Computer, or VIC. Due to be formally launched at the Las Vegas Consumer Electronic Show in January, the VIC went on sale in Japan in November.



Commodore are being customarily tight-lipped about the product but PRINTOUT can reveal that it uses the same 6502 CPU as the PET, the same character set - Western models will not feature the Japanese Kanji characters engraved on the key fronts shown above - and an almost identical PET BASIC, but with additional facilities to handle colour and sound.

Modular Approach

The entire computer is contained within a smart keyboard unit that requires only to be plugged into a colour television to run. The first model, which is expected to reach Europe around Easter, will have 5K useable RAM expandable up to 32K, and a standard typewriter keyboard with 66 keys which will additionally access the 50 graphics characters. Kit Spencer has hinted that the price will be "under two hundred pounds". However, PRINTOUT believes that the figure may be closer to £150 when it is released.

It is clear that Commodore's concept has been to produce a low cost computer capable of significant expansion. According to information in our possession, the company plan to release a large number of plug-in peripherals that will significantly increase the capabilities of the basic system. These optional extras are to include joysticks and a four-function keypad which will allow single-touch programming of BASIC keywords like RUN and GOSUB.

Graphics Mystery

PRINTOUT can now dispel some of the confusion that has surrounded VIC's graphics specification. The basic VIC-20 will have a screen layout of 22 characters by 23 lines. The presence of a border of single character width effectively reduces this to a resolution of 20 x 21. (A 40-column model, the VIC-40, is slated for production later in the year.) A high resolution graphics package in firmware is planned which will increase this to 176 x 184.

The key to the VIC is MOD Technology's Video Interface Chip which incorporates ROM, RAM and video circuitry and allows sixteen colours to be handled with each screen pixel capable of being colour addressable.

Pending official comment by Commodore, interfacing details remain unclear. The VIC has a device known as the 'Commodore Serial Bus' aboard. This is understood to be incompatible with existing peripheral devices. There has been speculation the company intend to corner the market in VIC peripherals.

PRINTOUT will be reporting more fully on the VIC in forthcoming issues.

Kernal Commodore's Fried Chips

Tired? Headaches? The problem could well be caused by software incompatibility. At last a solution is in sight. Well, not exactly in sight, but just over the horizon. It is called *The Kernal.*

The Kernal is a unique high-level utility, written in machine code by John Fagins. Theoretically, it will allow software written on one Commodore machine to run on any other. "The last incompatibility" was how U.K. Software Manager, Mike Whitehead described it. "The Kernal is like an extended jump table," he said. "It can sit in the top of all CBM machines enquiring about screen locations and size." A disk copy had recently been received at Slough and was undergoing tests.

The Kernal will eventually be fitted to all models as a standard part of the system software. The first machine on which it might appear is the new 8096. Firmware retrofits are likely and release of the source code into the public domain has not been ruled out.

A Close Shave

Chris Cary and the Compshop only narrowly avoided court proceedings over alleged copying of the Programmers Toolkit last month. As forecasted on this page, the Toolkit's distributors, Zynar Ltd., were on the point of applying for a High Court injunction. Colin Crook of Zynar later told PRINTOUT that he has received an undertaking that Comshop "would cease and desist from dealing in unauthorised copies of the Toolkit." He had initiated an investigation following the report in October's PRINTOUT that the Toolkit was being pirated.

It would not have been the first time that Cary and the Compshop have been involved in court action. They were previously successfully sued by The Software House over rights to a game program.

PEDDLE LEAVES COMMODORE

Amongst the latest batch of resignations from Commodore(a continuing phenomenon) is that of Chuck Peddle, father of PET

Peddle joineo Commodore as Director of Development four years ago, when they acquired MOS Technology, where he had been active in the development of the 6502 microprocessor, now found at the heart of every PET. He formed a close working relationship with Commodore's founder, Jack Tramiel, who agreed to fund Peddle's pet project, a self-contained micro-computer that would sell for $500.

This relationship proved sometimes to be a stormy one, and on one occasion Peddle marched out of Commodore to join Apple. But within a month he was back – and industry observers hailed it as a master stroke of industrial espionage.

Another recent departure is that of Chris Fish, head of Commodore's international arm, CEL. Fish was a long time associate of Commodore's President and a key figure in Commodore's financial set up. His resignation has shocked senior management.

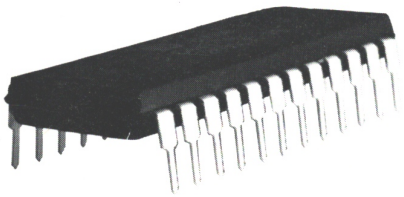
Speed up your PET programming with The BASIC Programmer's Toolkit,™ now only £30.00.

Don't waste valuable programming time if there's an easier way to go. Here it is: The BASIC Programmer's Toolkit, created by Palo Alto ICs, a division of Nestar. The Toolkit is a set of super programming aids designed to enhance the writing, debugging and enhancing of BASIC programs for your PET.

The BASIC Programmer's Toolkit has two kilobytes of ROM firmware on a single chip. This extra ROM store lets you avoid loading tapes or giving up valuable RAM storage. It plugs into a socket inside your PET system, or is mounted on a circuit board attached on the side of your PET, depending on which model you own.

There are basically two versions of PET. To determine which Toolkit you need, just turn on your PET. If you see ***COMMODORE BASIC*** your PET uses the TK-80P Toolkit. If you see ###COMMODORE BASIC###, your PET uses the TK-160 Toolkit. Other versions of the BASIC Programmer's Toolkit are available for PET systems that have been upgraded with additional memory.

Increase your PET's IQ for £30



How Toolkit makes your programming easier:

FIND locates and displays the BASIC program lines that contain a specified string, variable or keyword. If you were to type *FIND A$,100–500,* your PET's screen would display all lines between line numbers 100 and 500 that contain *A$.*

RENUMBER renumbers the entire program currently in your PET. You can instantly change all line numbers and all references to those numbers. For instance, to start the line numbers with 500 instead of 100, just use *RENUMBER 500.*

HELP is used when your program stops due to an error. Type *HELP,* and the line on which the error occurs will be shown. The erroneous portion of the line will be indicated in reverse video on the screen.

These simple commands, and the other seven listed on the screen, take the drudgery out of program development work. And for a very low cost. The BASIC Programmer's Toolkit costs as little as £30.00 or at most, £45.00.

Get the BASIC Programmer's Toolkit and find out how quick and easy program development can be. See your local PET dealer today.

PALO ALTO ICs
A Division of Nestar Systems, Incorporated

PET™ is a trademark of Commodore Business Machines, Inc. The BASIC Programmer's Toolkit™ is a trademark of Palo Alto ICs, a division of Nestar Systems, Inc.

The Toolkit is fully assembled. It is not a kit and requires no special tools to install.

Now available - the TK-4.0 for the new 4000-8000 PET

Contact your nearest Commodore dealer for the 'new deal' Toolkit

Now made available at super low prices in Europe by Zynar Ltd., Nestar's European business partner

ZYNAR 122/3 HIGH STREET · UXBRIDGE · MIDDX Telephone: Uxbridge (0895) 59831

HOTLINE ..... News..News..

WORDPRO IS BACK

If it ever really went away, that is. Following our report last issue that the authors had formed a new company to market the program themselves, Professional Software Ltd. has opened its doors at 25 Station Road, New Barnet, Herts. Although Commodore have ceased to be distributors, Word-Pro packages have now become Commodore Approved Products, so you will still find them at PET dealers. A new Word-Pro 4 Plus is expected shortly.

BASIC IT ISN'T !

We don't mean the language, but the situation. What situation, you may well ask? Well, it's like this. An apparently new 40-column PET has just appeared, under the model number 4032. It's accompanied by an also apparently new disk unit, under the model number 4040. But are they new? For apart from the numbers, there are no obvious physical differences.

It really depends on how you define "new". The difference, in PET's case, is in its Basic 4.0 chips, while the disk unit contains DOS 2.1. The two together should be happy bed-mates. Separately, if either is married to an earlier partner, the union may not be so blissful. And earlier software, used on the new combination, may suffer from unaccountable hang-ups too.

This is not to say that neither will work with the other, or that Commodore have goofed. Far from it; both Basic 4.0 and DOS 2.1 are real advances on their predecessors, and CBM are to be congratulated on bringing them in. As with all new things though, a start has to be made somewhere and the change-over may not be easy.

This is especially so if some PETs or disk units, labelled 3032 and 3040 on the outside, are really 4032s and 4040s at heart. Which is what may happen, with the release of the chips to dealers, together with little sticky labels so that the dealers know which units they've converted and which they haven't.

Look for a definitive article soon in PRINTOUT, covering all you need to know and then some, regarding the new chips: what extra facilities they offer; what advantages they give; what will happen if you use one with the other; and, most important of all, how to handle your earlier software in the new age that's dawning. For a preview, see our report on the 8050 disk drive a few pages on. That too contains the new Basic 4.0.

In the meantime, if you buy a 3032 or 3040, be sure to ask which chips are actually inside.

THE CASSETTE SOFTWARE MARKET – IS IT DEAD ?

An undercover investigation by PRINTOUT has disclosed widespread piracy of cassette software. Copying is being conducted on such a large scale that we estimate that there are now *two-and-a-half times* as many illicit copies as originals sold legitimately. At present, most copying is accounted for by software 'swaps' between individual users. The only institutional copying uncovered occurred in certain schools where it now appears to be endemic.

The results of our enquiry are confirmed by software producers who agreed that sales of cassette based utilities and games had declined sharply. The market for the more sophisticated higher priced software remains buoyant.

Petsoft stated that they were switching emphasis away from low-cost cassette software towards high quality products like VisiCalc which were more difficult to copy. They attributed a decline in sales of certain unprotected cassette programs directly to copying, although key products like Microchess continued to sell well.

Commodore agreed that a substantial volume of sales was being lost due to piracy and they were stepping up protective measures accordingly.

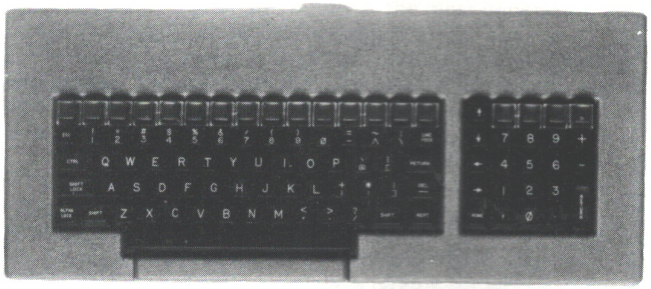
Programs of which illicit copies are currently circulating include WordPro, Petaid and software versions of the Programmers Toolkit, plus a variety of games and utilities.

CONVERT YOUR USER PORT

The three doctors at 3D have produced another useful device. This time it is a User Port Converter. It's a single channel Analog-to-Digital converter plus a single channel Digital-to-Analog converter. Slow it isn't. The conversion times permit sampling rates of $\geq$25KHz. Resolution is eight-bit and the input range is variable to $\pm$10 volts or 0-10 volts. Input is switchable unipolar/bipolar, while the output range is variable to 0-10 volts. You can address it in either machine code or BASIC. The unit comes in a smart case, housing its own power supply, complete with instructional software. The price is £200. Details from 3D on 01-387 7388.

NOSTALGIA CORNER

Last month we received a letter from the owner of an old ROM 8K PET. 'Had we forgotten the original PET?' he asked. Of course not! And to prove it here's news of a replacement keyboard offered by Century Research & Marketing Inc. of 4815 West 77th Street, Minneapolis, Minnesota



55435. The price is $135 but call them first to check the shipping cost; their number is 0101-612-831-8586. And no, they haven't got a UK distributor. Yet.

COMMODORE SHORTS

Now available – the CBM Modem at £225 – from Commodore communications dealers only.....More courses being laid on this spring. Titles include BASIC for Beginners, Advanced Programming with BASIC Disk Utilization, Service & Maintenance, Assembly Language Programming and PET Interfacing. Details from 01-380 5702.....Two packages for the 8000 series SuperPETs: The Accountant and Paymaster. Priced between £300 and £400 from CBM Business Dealers .....Commodore are starting European production at a new 90,000 sq.ft plant in Braunschweig, West Germany.....

UPDATE

The PicChip which was included in our review of Bolt-on Goodies in the Christmas issue is now distributed by Supersoft, 28 Burwood Avenue, Eastcote, Pinner, Middlesex. The price is £45 + VAT. It is also available by post from Insel Computers Ltd., 7 Bramshill Mansions, Dartmouth Park Hill, London N.W.5.

LEARN TO PROCESS WORDS

The Micro Computer Centre in South West London are now running regular one-day courses on Word Processing with the PET. Initially they will be using *Wordcraft* but plan to include *WordPro* later. The £70 price tag includes lunch. Details on 01-878 7044.

DMS MEETS WORDCRAFT & WORDPRO

Here's some good news for users of DMS, Wordcraft and WordPro. The news is that Compsoft have produced two programs to access files from their Data Management System and then generate 'fill' files for Wordcraft or WordPro. In practice this means that DMS users can direct personalized form letters at target customers selected from a DMS customer file. The price? £20. More information from the lovely Heather Kearsley on 0483-39665.

We apologise for an error in the price of the Little Genius Tutorial reviewed in our October issue. The recommended retail price is £40 plus VAT rather than £45 plus VAT as stated.

THE PET™ REVEALED

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SECTION 1. The PET System Hardware

Basic elements — CPU — Memory — Input and Output — Video circuit — System memory map.

SECTION 2. The 6502 Microprocessor.

An overall view — The accumulator and arithmetic unit — Processor status register and flags — Branching and Jumps — Addressing modes — The Index register — The Stack register — Interrupts — Data modify instructions — Machine code on the PET — Hand assembling programs.

SECTION 3. The PET operating system.

Routines from PET Basic — Variable memory map — Basic tokens — Program storage format — Overlays — Data storage — Numeric and string variables — Arrays — Garbage collection — Adding commands to Basic — Trace.

SECTION 4. The User Port.

User port connections — Video output circuit — Parallel user port — The 6522 VIA — User port memory map — Programming the user port — Hand-shaking on the 6522 — Serial I/O — I/O port expansion — Communication between processors — KIM to PET data handshaking — Summary of 6522 registers.

SECTION 5. The IEEE port and the 6520.

The 6520 and its registers — The PET keyboard — Modifying keyboard functions — Cassette unit — Merge — IEEE port — IEEE connections — IEEE signals — IEEE commands — IEEE to RS232 conversion — IEEE bus handshaking — The video display — Double density plotting.

Available from COMPUTABITS Ltd.,
P.O. Box 13, Yeovil, Somerset
Price £10.00

A NICK HAMPSHIRE PUBLICATION

What is Commodore up to?

Commodore has just enjoyed its most successful year ever. Sales rose 77% to $125m during fiscal 1980, with profits up by a striking 170% to $16m. Two thirds of the business was done by the Systems division, which produces the PET.

To find out what the Commodore has in store for 1981 Julian Allason talked to Kit Spencer, head of the U.K. operation and architect of the company's international marketing strategy.

PRINTOUT: We hear Commodore are planning to release an amazing new computer. Is it the VIC?
SPENCER: Yes. We will be launching it at the January Consumer Electronics Show in Las Vegas.
PRINTOUT: When will it be available here?
SPENCER: I am making no formal announcement at the moment, but would anticipate the U.K. introduction being around Easter.
PRINTOUT: VIC stands for Video Interface Computer. Tell us about it.
SPENCER: MOS Technology, our semi-conductor group have been working on a Video Interface Chip for some time. It combines ROM and Video circuitry RAM on the same integrated circuit which greatly facilitates interfacing of a computer to a colour television set. The result is a new generation of low-cost computers which may well prove to be the most important development in personal computing since the introduction of the original PET.
PRINTOUT: We have seen various prototypes, all of them different. What is the final version like?
SPENCER: Everything is packed into a smart keyboard unit including 5K RAM expandable to 32K and operating system and BASIC in ROM. It is a typewriter keyboard, not the calculator-type as I have seen suggested. You just plug it into the back of a T.V. The colour graphics are excellent.
PRINTOUT: Is the VIC compatible with the PET?
SPENCER: Up to a point. Most PET programs will run with minor modifications.
PRINTOUT: How much will it cost?
SPENCER: We have not decided the price yet.
PRINTOUT: We understand the U.S. retail price will be $399. That sounds like £199 here. Or even less ....
SPENCER (smiling): It will be priced low enough to appeal to a wide personal and educational market.
PRINTOUT: And after the VIC, what then?
SPENCER: Our subsidiary MOS Technology, expect to be replicating its NMOS products in SI-gate form this year. Complementary Metal Oxide Semiconductor has a low power requirement and is currently used in battery powered watches and calculators. It could provide the basis for a range of battery powered hand-held products, perhaps including computers .....
PRINTOUT: That sort of development is very expensive. Can Commodore really afford to take on the Japanese?
SPENCER: We currently invest 5% of sales in research and development. Over six and a half million dollars last year. Commodore has never been in better shape financially, and our intention is to maintain or increase our percentage of turnover spent on R&D. As for the Japanese, we respect them very much. Indeed, we have had our own Japanese company for over ten years and launched VIC there first.
PRINTOUT: We have heard rumours of larger memory PETs.
SPENCER: That's right. New CBM business system products for 1981 will include a 96K computer, 1.5 and 3 megabyte 8-inch floppy disk drives and we are working on a high memory capacity hard disk drive.
PRINTOUT: A year ago we saw an impressive speech synthesiser. When is that due?
SPENCER: It is not a priority project for us at present. However, we are working on a speech recognition system.
PRINTOUT: What about the low cost single floppy disk drive unit mentioned in last year's annual report?
SPENCER: It is coming, but although I am not making any specific announcements at this time, early in 1981 would be a probable release date. Incidentally, we now have a factory in Germany and most European products will be manufactured there by the end of 1981.
PRINTOUT: What are your plans for the U.K.?
SPENCER: We are working closely with a number of specialist software producers to develop and promote a range of top quality business packages that can be marketed worldwide. To this end we have developed a set of standard utilities that can be used by all the different software houses so that there is, for example, a standard method of data entry.
PRINTOUT: What do you see as the most important new area of expansion for the PET system in 1981?
SPENCER: Communications, undoubtedly. We now have twenty-five specialist communications dealers through whom the new Commodore modem will be available. It will allow PETs to talk to mainframes or to each other.

We are also pushing hard for the educational market with free seminars, newsletters and software.
PRINTOUT: Free software?
SPENCER: We have placed a number of educational programs in the public domain.
PRINTOUT: That's certainly a unique solution to the piracy problem. Do you enjoy PRINTOUT?
SPENCER: Yes. I think the balance is better now. But Inside Trader keeps getting it wrong. That story about me wearing a monkey mask and being punched by a dealer, for example. It was really just affectionate sex play .....

don't buy a daisy wheel printer.... before phoning 328 7145
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TOMMY'S TIPS TOMMY'S

A 64K PET?

I have a new ROM 32K machine but I have come to need more Random Access Memory. My dealer says 32K is the maximum on a PET. Is that really right?

Francis Stowell

Yes and no. You could add an extra 8K of expansion RAM — OMB or Small Systems Engineering should be able to help. If you have bought the CompuThink disk drive you will already have it. The bad news is that this additional RAM can't be addressed by BASIC. You can only use it for assembly language. Anything stored in this area is protected from interference by BASIC, so you won't get variables climbing down from the top. When I switch on, I load Commodore's SuperMON monitor into this area and it stays there until I switch off the power.

Commodore will shortly be announcing a model 8096, which as you may have guessed is a SuperPET with 96K of RAM. This should be capable of expansion to 256K, or perhaps more. Since 8 bit CPUs, like PET's 6502, can address a maximum of 65536 (64K) locations directly, bank selection has been employed to get around this limitation. Whilst we are waiting for the arrival of this marvel, you might like to try the following routine:

```
100 FORJ=1TO50:READK:PRINTCHR$(K);:NEXTJ
110 FORJ=1TO20:POKE32968,160:FORK=1TO200:NEXTK
120 POKE32968,32:FORK=1TO200:NEXTK,J
130 PRINTCHR$(145);CHR$(145)
140 DATA147,35,35,35,32,67,79,77,77,79,68,79
150 DATA82,69,32,66,65,83,73,67,32,35,35,35,13
160 DATA17,54,53,53,51,54,32,66,89,84,69,83,32
170 DATA70,82,69,69,13,17,82,69,65,68,89,46
```

It won't actually solve your problem but it might make you feel better.

JCL *SOFTWARE*

EPROM PROGRAMMER MKII

This new EPROM Programmer for the PET embodies all the features needed by the serious program developer wishing to use EPROMs of the 2516, 2716, 2532 and 2732 variety. Drawing its power from the PET mother board and effecting data transfer via the User Port, this design allows the full and unrestricted use of cassettes and disk drives.

EPROM Programmer mounted in situ

Comprehensive disk based software includes Menu driven programs for control of the Programmer and a Data/Instruction program to get you started.

Specification in brief:

* Regulated and fused power supplies to ensure glitch free and safe operation from the PET.
* Industry standard 24 pin zero insertion force TEXTOOL socket on front panel.
* Fully cased and free standing, or optionally mounted in PET between VDU and main chassis.
* Software allows PETs RAM to be loaded, from a master EPROM, from Binary Files recorded by the Monitor, or from object code files produced by JCL Software or Commodore Assemblers.
* EPROM Empty, Verify and Transfer commands for quick copying.
* "Uncrasher" buttons for use during program development.
* Access to PET Monitor and return to Menu, facilitating single byte modifications to PETs RAM content prior to programming.

Prices £250 for MkII version described. [For use with 16/32K PETs and SuperPETs.]

£200 for MkI version for 2716/2732 EPROMS only.

Available from:—

Tunbridge Wells 27454

47 London Road, Southborough, Tunbridge Wells, Kent.

OLD & NEW ROM POKE CONVERSIONS

I am having problems converting the POKEs to make programs written for an old ROM machine run on a new ROM PET. Can you help?

B.G. Watkins

Sure thing, Mr Watkins. Try the following list which covers some of the really useful locations. POKEs to the screen remain the same, of course.

OLD ROM	NEW ROM	FUNCTION
POKE3,0	POKE14,0	Returns the keyboard as the input device.
10-89	512-591	The 80 byte basic input buffer.
102-103	020-021	Pointer to last string low byte, high byte
122-123	040-041	Pointer to start of basic,low,high
124-125	042-043	Pointer to end of program and start of numeric variables.
134-135	052-053	Pointer to top of memory (135 & 53=128 for 32K)
136-137	054-055	Number of current line being executed
138-139	056-057	Contains line number for CONT command
140-141	058-059	Pointer to next statement to be executed
142-143	060-061	DATA line number for errors
144-145	062-063	DATA statement pointer
148-149	066-067	Name of current variable in use.
150-151	068-069	Pointer to variable in memory.
166-171	084-089	Floating accumulator number 3
176-181	094-099	Floating accumulator number 1, used by USR function
184-189	102-107	Floating accumulator number 2
194-199	112-117	Gets next character from BASIC text.
200	118	CHRGOT RAM code regets current characters
203-222	121-140	Next random number in storage
224-225	196-197	Pointer to start of line of cursor location
226	198	Column position of cursor
227-228	199-200	General purpose start address indirect
234	205	Flag for quote mode on/off
238	209	Current file name length
239	210	Current logical file number
240	211	Current secondary address
241	212	Device number
243-244	214-215	Start of current tape buffer
245	216	Current screen line number
247-248	251-252	Pointer to start location of operating system
249-250	218-219	Pointer to current file name
512-514	141-143	24 hour clock in jiffies
515	151	Matrix co-ordinate of last key pressed
516	152	Shift key indicator =1 if shift key pressed
525	158	Number of characters in input buffer
526	159	Reverse flag indicator
527-536	623-632	Keystroke buffer
537-538	144-145	Interrupt vector, add 3 to 537/144 to disable stop
549	168	Countdown for cursor flip
550	169	Screen value of character under cursor
630	192	Divide by two for error count on tape #1
631	193	Divide by two for error count on tape #2

Recovery from NEW

Having just destroyed the program I was working on by accidentally executing a NEW, I would like to know if there is any way of getting it back.

I. Aziz

Many is the time I have done the same, especially in those wee small hours so beloved of programmers the world over. If you simply need to list it, try POKE1026,4:SYS50242. Don't attempt to run or modify it however. That would be tempting providence too far.

Peter Hewitt of SUPA devised the following method of recovering a program completely after a NEW. Type each line in and press Return. You should then be able to proceed normally:

```
POKE 1026,4:SYS50242
POKE 42,0:POKE 43,3:CLR
FORI=1027TO32000:IFPEEK(I-1)+PEEK(I-2)+PEEK(I-3)<>0THENNEXT
I(1)=I
POKE42,1-256*INT(I/256):POKE43,INT(I(1)/256):CLR
```

Well done, Peter!

REDIMENSIONAL ARRAYS

Redimensional arrays was a subject tackled in a PUC paper recently. However, they got it wrong. A routine that works is:

```
100 P1=0:P2=0:REM THIS IS IMPORTANT
110 DIMA$(15):REM DIMENSION ARRAYS YOU WISH TO KEEP HERE
120 P2=PEEK(46)+PEEK(47)*256:P1=PEEK(44)+PEEK(45)*256
130 REM P1 & P2 ARE START AND FINISH OF ARRAYS
140 DIM B$(12):REM DIMENSION ARRAYS HERE YOU WISH TO USE
150 REM AND LATER ERASE
160 FORB=1TO12:B$(B)=STR$(B):NEXT
170 FORB=1TO15:A$(B)=STR$(B*2):NEXT
180 A$="HELLO":D=600:GOSUB280
190 REM DELETION OF ARRAYS
200 Z=PEEK(44)+PEEK(45)*256:Z=Z+P2-P1:P1=INT(Z/256)
210 POKE47,P1:POKE46,Z-P1*256
220 REM THE TEMPORARY ARRAYS HAVE NOW GONE
230 REM BUT ALL VARIABLES HAVE BEEN PRESERVED
240 REM TO REPEAT GOTO 120
250 PRINT:PRINT:PRINT"A$(B)":FORB=1TO15:PRINTA$(B),:NEXT
260 DIM B$(1,2)
270 END
280 PRINT:PRINT:PRINT"B$(B)":FORB=1TO12:PRINTB$(B),:NEXT
290 PRINT:PRINT:PRINT"A$(B)":FORB=1TO15:PRINTA$(B),:NEXT
300 PRINTA$,D
310 RETURN
320 REM FOR OLD ROM PETS
330 REM 44=126, 45=127
340 REM 46=128, 47=129
```

A. L. Minter,
Whitefriars Way,
Sandwich

Microsoft BASIC, in common with almost all others, is designed to prevent arrays being redimensioned. But there is no doubt that such a facility can be extremely useful, particularly when you want to change a single element array to a multi-element array. I have added a final polish to your routine which works well. Be sure to enter all the arrays you **don't** want to redimension at the beginning.

TAPE FILING

I am experimenting with various ways of creating program and data files on tape, and would be grateful if you could suggest a way of overcoming a particular requirement which so far I have not been able to solve.

In trying accurately to position a tape for read/write, a limitation is the fact that the tape is set up to use a 191 byte buffer. This means that on, say a GET statement, the tape will always search to the next inter-block leader before reading. If the tape had stopped just after the beginning of a block, it would then search on to the next block before filling the buffer.

Can a simple way be found to either set the tape control to 'think' in terms of a much shorter buffer, i.e. 50-100 bytes, or to cause the GET statement to get immediately from tape without waiting for a block leader (once a file has been opened?

In this manner, a timing tape could be created which could be used to very accurately determine the characteristics of a particular tape/cassette combination.

David J. Pollock

The only straightforward way of bypassing the tape buffers that comes immediately to mind is by using CMD followed by a LIST command:

OPEN1,1,1:CMD1:LIST

This would list a program file to tape without inter-block gaps. The GET#1 command (not INPUT#1) can be used to read it back. Since this only works with listings you would need a short routine to reject the line numbers: you would however, be able to determine the characteristics of the tape/cassette combinations.

Supposing you have a 50 line program in RAM, the procedure would be to dump it to tape using the CMD command line above. Once it has been dumped type PRINT#1: CLOSE1 to close the file. You should then be able to read it with the GET statement. Since the tape buffers are not being used it will list directly to a tape in drive#1.

To read back:

```
10 OPEN1
20 GET#1,A$:PRINTA$;:IFST=0THEN20
30 CLOSE1
```

PROGRAMMABLE CURSOR

One of the features I like best about the Sinclair ZX-80 is the way in which the cursor character changes to tell you what mode you are in. So this month I will close by offering you a machine code routine for new ROM PETs that allows any character to be chosen as the cursor. My thanks to reader David Simons, who wrote it:

```
100 PRINT"□_____":PRINT"■ CURSOR MAKER "
101 PRINT"──────────────────────────────────"
102 PRINT"_____":PRINT"■ LOADING THE MC "
103 PRINT"──────────────────────────────────"
104 FORT=826TO937:READA:POKET,A:NEXT
105 PRINT"□_____":PRINT"■ CURSOR MAKER "
106 PRINT"■■AUTHOR - DAVID SIMONS."
107 PRINT"──────────────────────────────────"
108 PRINT"□TO ENABLE :-"
109 PRINT"■POKE144,58:POKE145,3"
110 PRINT"──────────────────────────────────"
111 PRINT"□TO DISABLE :-"
112 PRINT"■POKE144,46:POKE145,230"
113 PRINT"──────────────────────────────────"
114 PRINT"□TO ALTER CURSOR"
115 PRINT"■POKE 834,X (WHERE X = CHARACTER)"
116 PRINT"──────────────────────────────────"
117 PRINT"□DISABLE THIS MACHINE CODE BEFORE LOADING"
118 PRINT"ANY PROGRAM"
119 PRINT"──────────────────────────────────□□" :END
120 DATA  76,111, 3,168,24,164,198,169,100, 145, 196, 162,242,160,8,200,208
121 DATA253,232,224,1,208,248,164,198, 165, 169,145,196,76,105,3,165,169,145
122 DATA 196,169,1,133,167, 76,46, 230,0,0,0,0,77,230,255,76, 94,3, 169
123 DATA 0,133,168,165,196,201,160, 208, 15,165,197,201,128,208,9,165, 198
124 DATA201,21,208,3,76, 151, 3, 165, 196, 141,118,3,165,197,141, 124, 3, 165
125 DATA198,141,130,3,164, 198, 177, 196, 133,169,165,167, 201,0,208, 3, 76
126 DATA  62, 3, 76, 94, 3, 62, 3
127 PRINT"■"
```


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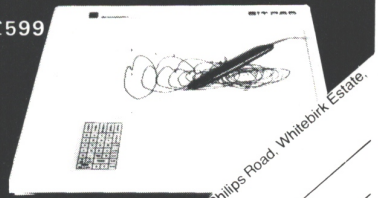

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PD1180

OZZ

Goodbye YELLOW BRICK ROAD

Insiders have hailed 'OZZ, the Information Wizard' as the first of a new generation of intelligent information retrieval programs for the PET. Richard Pawson reports why.

For the three years in which the PET has been on sale, business software has been steadily plodding the yellow brick road of traditional Data Processing. Payroll packages are legion - book-keeping programs spawning; if there is one thing that the failing minicomputer business has achieved, it is in convincing the general public that *this* is what computing really means.

When the microcomputer was first conceived, all that was supposed to change - with localised calculating power on the desk of every businessman, helping him to make his decisions and supplying him with the necessary information. But where *is* the requisite software? Like lions without courage the software producers have continued to follow the yellow brick road, few venturing into the uncharted wilderness on either side.

Program of the Year?

The program Ozz - dubbed by Commodore 'The Information Wizard' - is perhaps only the second piece of software fully to employ the original concept of the microcomputer. (VisiCalc is the other.) It is versatile, adaptable to many business applications, highly interactive, user-friendly and makes full use of PET's storage and calculation facilities. Without hesitation, I nominate Ozz for Program of the Year. By the end of this report, I hope you will see why.

First and foremost Ozz is an intelligent information retrieval system - capable of handling up to 10 diverse applications at any one time. Such applications as: order processing, stock control, mailing lists, customer records, product cataloguing and standard letters - each one custom-designed by the user. Information is held in records - a record constituting one 80-column screenful of information in a specific layout (a 40-column Ozz has been promised).

Designing the Record Layout

The first stage in implementing a particular application is to design the record layout. This is much the same as drawing up a standard form on paper - for a card filing system perhaps. For each item of information a box or field is drawn on the screen, defining the physical boundaries for that item, along with an appropriate field name or title. For example, there might be a customer's name field, another box for the address, with account or personal interest details lower down the screen or 'page'. Particular records are then filled out for each occurrence and at any stage new records may be added, old ones deleted, or erroneous ones amended. This is simply 'file management' and as such is not a new idea.

What is refreshingly new, however, is the user-friendliness of this whole process. Not only is the user free to design an attractive form on the screen, but these 'forms' are com-

pleted using the new 'total screen input' method, which Commodore U.K. are adopting in all new software. Instead of being asked for the contents of each field sequentially, the user is presented with a blank record, and is free to complete the fields on the screen, in any order, making changes or corrections before giving the final O.K. to enter the record. The cursor is physically constrained to remain within the boundaries of a field but may be moved from box to box as required. This input system is moreover completely bomb-proof against user error. Incidentally, the whole 22K of Ozz is written in machine code for speed - a herculean task that was undertaken by John Kyle-Price of Bristol Software Factory.

Getting the Information Back

Retrieving the records is the next obvious step, and here there are several alternatives for different situations. First, one can simply enter the record number (for example 214) for the desired occurrence. Response time is very fast indeed, but this is of little use unless you have only a few items, or a remarkable memory for numbers. More commonly, one is presented with a blank record and the Key Field for the desired record is entered in the appropriate position on the screen. The Key Field might be the sub-contractors name in a quotations application, or the product code in a cataloguing system. Ozz searches for this record and automatically fills the screen. The first intelligence appears here - Ozz allows for mixed upper and lower case and for short-forms. Thus the customer record for "A. R. BRAITHWAITE" could be retrieved by "a. r. braithwaite" or even "A.R.Brai*", which is a very useful feature indeed.

It is in searching for unknown records that the program really saves time. One might ask for the titles of all books in stock which mention Ornithology, or the medical records of all patients over 40 who have suffered bronchitis in the London area! Again, the search criteria or 'request-form' is filled out on the screen using the 'less than' or 'greater than' symbols, or by simply entering substrings in the alphanumeric fields. Records can be printed out on a Commodore or other printer.

Were this all that Ozz is capable of, one might conclude that it was useful but not particularly new. However, two major features - calculation, and report generating - more than double the power and versatility of the system.

Calculation Anytime

The built-in calculator facility allows mathematical relationships to be defined, between individual fields on the screen. Thus, having filled in the boxes for PRICE and DISCOUNT, the user may type at the bottom of the screen: NET PRICE = PRICE – DISCOUNT, which will fill the NET PRICE field automatically. Temporary variables (for example SUBTOTAL) may also be defined and stored, for recall in later calculations. Most powerful, however, is the CALCULATOR PROGRAM command, whereby a sequence of operations is stored as a program in memory or on disk, for "processing" records. A typical application might be cash flow analysis, where the figures in each record (in this case invoices) are summed according to the classification of expenditure.

We have already noted that anything which appears on the screen may be duplicated on a printer, but Ozz also contains a Report Generator. This is an 80-column Text Editor which can be used to create, print or store standard letters or documents. Inserts may be defined within the document, to be filled by fields extracted from records, again either manually or automatically. The EXECUTE AUTO command will perform three commonly used functions: run the current calculator program, update the now modified record on disk, and print the required excerpts onto the document.

Readable Manual

All this adds up to remarkable flexibility, and for once, it is backed by excellent documentation! The manual is liberally sprinkled with relevant screen pictures and the progression through Ozz's capabilities is logical - forcing the user to follow worked examples from the start. Each chapter is followed by a summary of points covered. Although the text is typewritten - almost certainly having been prepared on a PET word processor - boxes representing the keys to be pressed have been patched in, rather like the better calculator manuals. All this adds up to a much easier-to-follow introduction process for the non-computer user.

Limitations

Lest readers suspect that this is all too good to be true, we should mention some limitations. The most serious restriction in trying to implement an application stems from the Relative Record size in the new DOS (Ozz requires an 8032 PET and will handle up to 4 disk drives - either 8050 or 4040, to be specified at time of purchase). This restricts the user to 252 bytes of variable information per record; in other words the total sum of all fields on the screen must not exceed 252 characters. If, for example, a record is to contain the full name and address of a customer - there will not be much room left for additional information. It is a pity that there is no provision in the software for multiple Relative Records per screen.

Secondly, although Ozz can handle up to 10 applications (i.e. record formats) at once, interaction between these files is not possible - ruling out automatic links between, say, a stock record and a supplier record. It would appear that this omission was deliberately made in the interests of simple operation.

Not a Database

Leaving aside the bugs (several surfaced in the Amend and Delete functions, but we are assured that these have now been corrected), we have a further complaint which concerns the terminology employed. The manual refers to Ozz as a Database; it is not a database. Ozz is an intelligent information retrieval system with several unique features.

A Database is a large utility from which any application based on data handling can be constructed. All proper databases conform to an international set of standards with regard to the data structure: items, occurrences, records, sets and one-to-many or many-to-many relations. The fact that PET does not yet have a true database (though with larger RAM and hard disks on the way it cannot be far off) is no excuse for distorting the terminology that our industry has so carefully generated. In this respect, Ozz is far from being the only offender.

The Competition

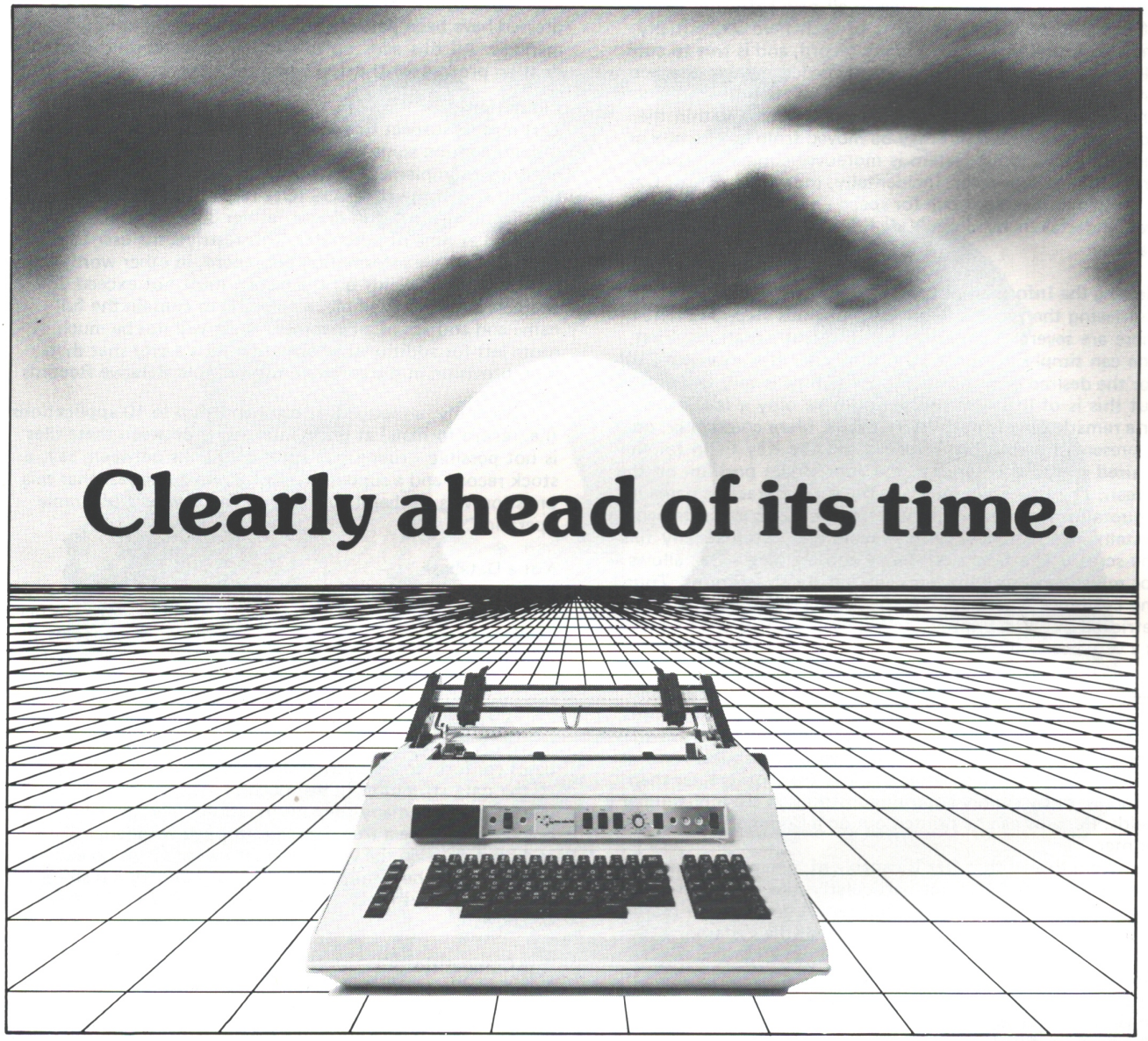
No review is complete without a comparison with 'nearest neighbour' products. Two spring to mind - Petaid (see PRINTOUT Vol.1 No.9) and VisiCalc. The former is written in BASIC, and as such is somewhat slower, but has the considerable advantage that it can readily be interfaced with custom-written code for specialist applications. Having tested similar applications on Ozz and Petaid, with non-computer users, the general opinion is that Ozz is the more user-friendly of the two, with screen editing and prompts being the deciding factors.

Contrary to early rumour, VisiCalc and Ozz are two totally different programs. VisiCalc is a superb live calculation tool used for financial modelling/forecasting or any other form of tabular calculation. While the Ozz field calculation function appears similar to VisiCalc, it is purely for a specific purpose, and cannot be used to achieve the same applications. The two programs are comparable only in the sense that both employ the interactive concept of the microcomputer, and both are of a high quality.

Conclusion

It seems that software may at last be heading in a sensible direction. With luck the days may be over when the non-technical businessman is told that in order to install a micro, he must change his entire methods of working. We now know that it is possible to sit down and have an information retrieval application running to *his* requirements in less than 30 minutes! That's progress indeed to our way of thinking.

Ozz is available at £300 from Commodore Commercial Systems Dealers.



Line Printer	Matrix Printer
Ink Jet Printer	Qume's Sprint 5

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WHICH PET PRINTER?

One of the most difficult decisions confronting any PET owner is the choice of printer. Leading expert Robin Bradbeer presents our guide to hard copy for your PET.

One of the first items that most computer users find they need, after they have exhausted the basic system, is a printer. This allows listings of programs, initially, and then more complicated functions such as text editing and word processing to be carried out.

The PET is fairly unique in that it uses a different interface standard for its peripherals compared to most other desktop computers. This means that the vast majority of printers available on the market are not designed to plug directly into the PET. It is possible to purchase interface adapters, and the necessary IEEE-488 to RS232 adapter will cost around £100, or perhaps a little less. This does, however, introduce another variable into the system, and obviously printers with the appropriate interface should be considered first. Consequently only those printers with the appropriate IEEE-488 interface, or option, are looked at in the first part of this report.

Typewriting

The simplest way of generating printed output is to use a converted electric typewriter. There are a number of these around usually based on the IBM Selectric range. The computer uses software, or a hardware board, to convert the signals into the format used by the internal electronics inside the typewriters. Sometimes these will allow the keyboard to be used to enter information as well.

The Selectric machine is an IBM design available in a series of different versions. The spherical type core is common to all of them. This gives very good print quality, it is replaceable, and there are many different type styles.

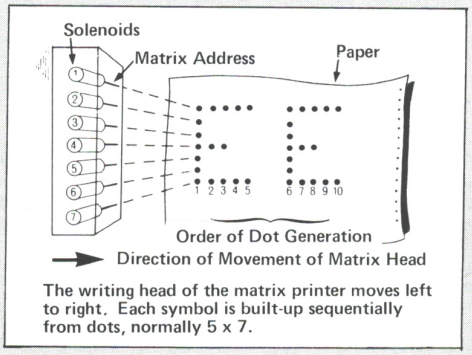
In its simplest form, the Selectric machine is a normal electric typewriter, which has had its established place in offices for many years. But since the construction is entirely mechanical throughout (apart from the electric driving motor) it must be considerably modified to be able to work with the signals of the computer. There are some modification kits available from various firms.

Several firms have also begun to market Selectric terminals that are reconditioned and modified for PET; in other words, completely ready to connect to the computer.

A word of warning about the Selectric machines: the internal mechanics are pretty advanced and may be difficult to repair on one's own. In other words, avoid faulty Selectric machines.

Dot Matrix

Another method of producing characters on a page is by printing dots based on 5 x 7 matrix. Most characters and graphics symbols can be generated this way. The simplest dot matrix printer consists of seven needles in a vertical line that are "fired" onto the paper as the head moves from left to right. Five such "firings" are needed to produce each character. A normal typewriter ribbon means that normal paper can be used. The cheapest dot matrix printer is around £150.



The writing head of the matrix printer moves left to right. Each symbol is built-up sequentially from dots, normally 5 x 7.

It is possible to do quite complicated characters with dot matrix printers as each character can be programmed individually. If the computer system used has a graphics capability a dot matrix printer must be used otherwise these characters will not be printed. And it is here that the non-standard graphic characters of the PET cause problems. Whereas the normal alphabetical and command characters will reproduce on practically any printer with an ASCII interface the graphics do not. A PET computer *must* have a PET-compatible printer to reproduce its graphics.

It is also important to make sure that the printer can be programmed to reproduce different line widths. The usual 40 characters per line of the 2000 and 3000 series systems means a bit of juggling if an 80-line printer is used. Similarly with the 80 character SuperPETs running on a 132 character printer. It is essential that some method of programming the output to take these incompatibilities into account is available.

Correspondence Quality

If good quality output is required then either a converted Selectric typewriter, or specialised printer, is required. The daisy wheel printer is a form of impact printer that has all the characters around the rim of a circular plastic disc. A hammer hits the appropriate character to produce the printed symbol needed. These are rather expensive when compared to other sorts of printers but give good quality at high speed. With most daisy wheel printers it is possible to program them, from the computer software, so that right and left justification with proportional spacing is available. They are designed for word processing applications.

The printers mentioned above all use impact technology and rely on ink coming from the typewriter ribbon to create the image on paper. They also use normal paper. There are other ways of getting image onto paper and some printers use these methods.

Thermal Printing

Heat sensitive paper is used by a number of small printers. These usually have about 40 characters per line. A small dot-matrix heating element moves across the paper, and where a hot spot is created a blue dot appears on the page. They are quick, and because there is no impacting, very quiet. The paper is rather expensive however, and is usually only available in 2" to 3" wide rolls.

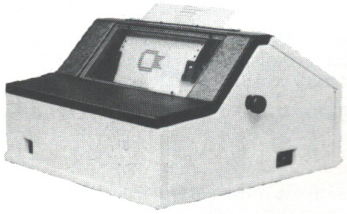
There are other forms of heat sensitive paper that has an aluminised finish. This is even more expensive than the previously mentioned paper.

When we have to consider the printers available, the obvious choice is the PET printers. However, there are many others, although few actually reproduce PET graphics. For high quality printing a dot matrix printer is not recommended.

Daisywheel printers have halved in price during the past twelve months, as we forecast they would. Commodore themselves are starting to market a badge engineered Olympia machine at £995 and there are several others on the way.

YOU DON'T HAVE TO SHOUT !

If you are the proud owner of a Commodore printer, you won't have failed to notice the noise it makes. Loud and piercing. So it was good to hear that Mitrelynn have pro-



duced a special acoustic cover which they say will cut out more than 80% of the din. They wouldn't lend us one to test, so we can't tell you whether that's true, but we have no reason to disbelieve them. Meanwhile we are saving up for one; after all £65 isn't a lot to pay for peace and quiet. Details on 0223-835792.

WHICH PRINTER? WHICH PRINTER

There are now so many printers on the market that it is difficult to keep track of them all. We have therefore chosen to report on those of established reputation and availability. Even so, space has not allowed us to cover every printer we tested or were aware of. Where manufacturers offered a range, we concentrated on the model likely to be of greatest interest to PET users. In each instance we have indicated the name of a reputable supplier, not necessarily the manufacturer or importer, who is prepared to supply further information. Due to intense competition prices have become very fluid. In the case of daisy wheel printers (Commodore excluded) substantial discounts can be obtained. We have indicated this with the words "or less" following the retail price. PET dealers will usually supply most of the printers listed, upon request.

This second part of our report is divided into sections dealing with printers which will plug directly into the PET and generate the full graphics set, those which will plug in directly but do not support PET graphics, and printers which require a separate interface to connect them to the PET.

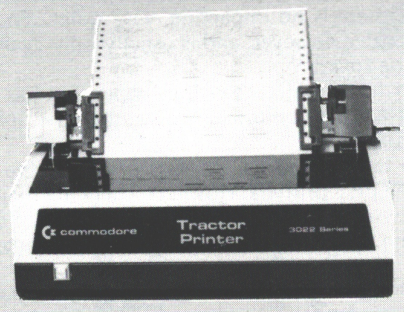
All prices exclude VAT.

The PET Graphics Printers

These printers plug directly into the CBM/PET without the need for additional interfacing.

Commodore 3022 £425

The most popular PET printer of all, but alas, far from perfect. Commodore recommend this, their smallest printer for 'computing' rather than commercial applications. We agree. Implementation of both upper and lower case ASCII characters plus the full graphics set (including reverse field) make it ideal for program development and listings. The discrepancy between its standard 7x6 dot matrix and the 8x8 dot screen format means that lower case letters lack true descenders and the graphics look odd transposed from screen to paper. These characteristics are shared with the other printers using 7x6 matrix. One extra character can be programmed, which is useful if you need



a £ sign. It prints at around 93 characters per second with a high pitched shriek that has driven some users to encase it in Mitrelynn's special acoustic cover. It is small and light enough to be easily transportable. Print width is 80 columns per line. The 3022 is a 'smart' printer with its own microprocessor built-in. A 'secondary addressing' feature exists to enable the printer to accept and store instructions on how text is to be printed out. Unfortunately two serious bugs have plagued users. The first results in an extreme reluctance to List programs in lower case without jumping into graphics mode, whilst the second necessitated the prefixing of any string to be printed with a 'cursor down'. The first attempt to cure these merely made matters worse; however the word now is that Commodore have cracked the problem.

The 3022 has tractor feed, which is to say it uses paper with holes punched in the side. For plain paper there is also the otherwise similar friction feed CBM3023 which costs £375.

For a full evaluation see PRINTOUT Volume 1 No. 4, April 1980.

Optional extra

JCL Software offer in kit form a useful solution to three of the less serious problems from which the CBM3022 suffers. Solution one is a bleeper that signals 'paper out' so you can switch off before the needles start drumming on the print bar. The second item is a replacement cover plate with a perspex window that enables you to see what the head has just printed. Solution three is a stainless steel tear bar for precision paper tearing. All this costs a very reasonable £12.50 from:

JCL Software, 47 London Road, Southborough, Tunbridge Wells, Kent (Tel. 0892 27454).

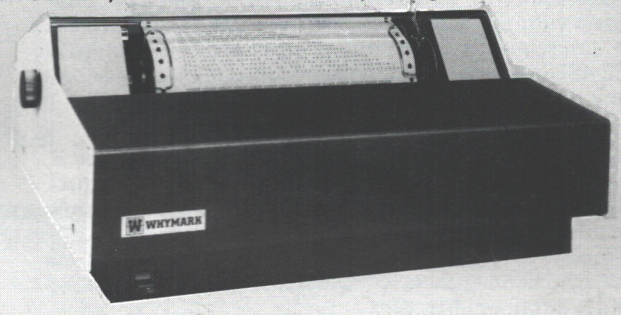
Dolphin BD80P £525

British built bi-directional printer capable of sustained use. The speed is a handsome 125 characters per second. The full 96 ASCII characters are supported on 9x7 matrix whereas 11x7 is used for the PET graphics. The finished results are excellent. Sprocket feed is adjustable and there is an efficient self-test facility. The BD80P is noticeably quieter than other printers in the same class. Double width characters are supported and up to ten additional characters can be defined by the user. We found this particularly useful. The buffer stores up to 750 characters. (Minor technical problems were experienced when it was first introduced a year ago but these have now been resolved.)

Walters Microsystems, 1 Blenheim Road, Cressex, High Wycombe, Bucks. Tel: 0494-445172.

Whymark 801 £750

The 801 is another 'smart' printer which uses proportional spacing to produce a 7x7 matrix with true descenders on lower case characters. It has a bi-directional mechanism capable of delivering up to 150 characters per line at a respectable 70 lines a minute. Full PET graphics are standard, as is a 600 character buffer, although this is reduced if



the user defined character facility is in use. An additional 1K or 2K of buffer memory is available as an extra. One of the features we like best about the 801 is the ability to vary the space between characters. Double width characters and underlining are available. It accepts 9½" wide pin feed paper, giving a print width of 8" thereon. Headings may be centred automatically.

Whymark Instruments Ltd., 6 Holmesdale Road, Reigate, Surrey. Tel: 07372-21753.

The Plug-in PET Printers

The PET versions of these printers are supplied ready for connection to the computer. Pet graphics are not supported.

Anadex DP8000 £495

Since it was first introduced two and a half years ago the DP8000 has become one of the most widely used 80 column printers. During that time it has also established a reputation for reliability. The recent price reduction now makes it competitive with rival machines of later vintage. The 9x7 matrix gives noticeably better definition than some of the other printers tested. Printing speed is a snappy 112 characters per second. Useful features include moveable paper feed sprockets which allow the use of different paper sizes through the tractor feed. A number of improvements have been made since we first used the DP8000. The buffer is now 1K as standard with an additional 2K as an option. A self-test facility provides a diagnostic check of the main functions. Be sure to specify the PET model when ordering.

Anadex Ltd., Dorna House, Guildford Road, West End, Woking, Surrey. Tel. 09905-6333.

Base 2 Model 800MST £395 or less

One of the first of the real mass production bi-directional tractor printers to be discounted heavily. The character set includes the standard 96 ASCII, expanded width characters and up to five additions. Six print densities handle column widths of from 64 to 132 characters per line. Print speed is quoted as 60 lines per minute and the terminal buffer as 2K. Specify PET cable when ordering. Print quality is adequate for software development and similar applications.

Easicomp Ltd., 57 Parana Court, Sprowston, Norwich

Commodore 8024 £1160

This is the printer your Commodore dealer will try and sell you to go with the 8032 SuperPET and 8050 disk drive. That's not to say that 4000 series users won't be buying it. It is a fast – 160 character per second – bi-directional printer intended for continuous high speed commercial use. But, because of the price, we would stress its suitability for high volume applications. The absence of the special PET characters led us to suspect that Commodore might have indulged in a little badge engineering. Lifting the bonnet we found a well-engineered Mannesman-Tally 132 column printer with a robust 9x7 dot matrix head capable of punching out an original plus four clear copies on normal office paper. That's one less than Commodore claim but one more than the other printers we tested. Considering the speed

we found it surprisingly quiet in operation. Double width characters are supported as are true descenders. The fast printing speed has been achieved by imparting sufficient intelligence for the print head to proceed bi-directionally to the position of the next character without slavishly hammering on to the end of the full line width as most printers do. There is a high degree of compatibility with software written for the CBM 3022, since the 8024 will respond to the same first three secondary addresses as used on the smaller printer. Users with occasion to use the hash symbol are in for a pleasant surprise. It has turned into a pound sign — just about the first we have seen resident in ROM.

Commodore 8026 £995

Early last year we forecast that Commodore would do a deal with Olympia on their daisy wheel electronic typewriter — we even got the price right. Although we have details of the standard Olympia model, we have yet to see the version produced by Commodore. So we will

content ourselves by observing that it generates superb results at around sixteen characters per second, which is to say, slowly. It handles 10, 12 and 15 pitch print wheels plus proportional spacing and paper up to 13" in width. Watch out for a detailed review in a forthcoming issue of both the 8026 and its keyboardless confrere, the 8027, slated for delivery later this year.

CPS 3982 £960

A number of different companies have offered refurbished IBM golf-ball printers at different times. The degree of refurbishment has varied from a lick of paint to complete overhaul. CPS tell us they do thoroughly recondition the units they sell. We have not tested one of their machines, but after six months experience with a 3982 supplied by a different company, we feel able to recommend them on the basis of the excellent correspondence quality printing. The mechanical complexity of the printer requires skilled maintenance which IBM themselves decline to provide. CPS do offer a nationwide repair service for units sold by them. At 15 characters per second the printer is slow and noisy. It offers 132 characters per line and a self-test facility. Except where print quality is of paramount importance, we think one of the new low-cost daisy wheels might be a better choice for word processing applications.

CPS Data Systems, 1102 Warwick Road, Acocks Green, Birmingham. Tel: 021-707 3866

ElectroGraphic EG800M £476

A remarkably versatile bi-directional printer of medium speed. The 9x9 matrix prints normal characters with true descenders at 80 columns per line, enlarged characters at 40 columns and condensed characters at 132 per line. Condensed enlarged characters run to 66 to the line. A further option is bold face. In addition to the standard 96 ASCII characters are 64 graphics characters from which headlines can be created. Unfortunately, they are not the same as the PET character set. Print quality is amongst the best we have encountered on dot matrix printers. The necessary optional IEEE interface + PET interface cable have been included in the price calculation above.

ElectroGraphics Ltd., Printinghouse Lane, Hayes, Middx. Tel: 01-573 1826

Epson MX-80 £438

This is the printer that's advertised as having a disposable print head. As the life of the head is quoted as better than 50 million characters, we don't think you should attach too much importance to that. The 9x9 matrix font is of unusual and pleasing design. We found it more readable than some. The full 96 character ASCII set is present, complete with true descenders, plus 64 block graphics characters (not the same as PET graphics). Print speed is a moderate 80 characters per second and there is a choice of 40, 66, 80 or 132 column widths. The MX-80 also has a little brother called the TX-80 which costs £338; that's also said to be PET compatible, but we have not seen it.

Dataplus Ltd., 39-49 Roman Road, Cheltenham, Glos. Tel: 0242-30030

Ricoh RP1600 £1450 or less

The Ricoh has been undergoing a process of development which looks like resulting in a very exciting machine. Having originally been supplied by Ricoh with a non-standard interface, a number of problems were experienced. The distributors tell us they are just beginning to receive deliveries of units with an IEEE interface. However, as these were not readily available when this report was compiled (December 1980), we have included the RP1600 in this section. Each print wheel has a total of 126 characters, two to a petal to reduce inertia and increase print speed to an impressive 60 characters per second. This was faster than any other correspondence quality printer we evaluated. Print quality is still first class, and there are a number of unusual typefaces. Maximum carriage width is 163 characters. Automatic sheet feed costs £695 extra.

Small Systems Engineering, 2/4 Canfield Place, London NW6 Tel: 01-328 7145

Whymark 40 column range.

Whymark offer a range of specialist 40 column printers with PET interfaces. All use a 7x7 dot matrix, with a 64 character subset of the standard ASCII 96. The 201 is a free standing tally roll printer producing up to 40 characters on 3-7/8" wide plain paper; it is primarily intended for recording weighing results, hard copy for scientific measuring instruments, and point of sale receipts. Model 204 is a label printer with capacity for a roll of 1,000 self-adhesive labels. These are fed by a pinch roller and optically sensed for accurate positioning. The 301 is a document printer that senses and grips preprinted forms. Model 501 is a panel mounting unit providing the same facilities as the 201, especially suitable for use in weighing and data logging applications.

Whymark Instruments Ltd., 6 Holmesdale Road, Reigate, Surrey. Tel: 07372-21753

OTHER PRINTERS TO CONSIDER

An additional interface is required for connection of these printers to CBM/PET.

Dot Matrix

Centronics

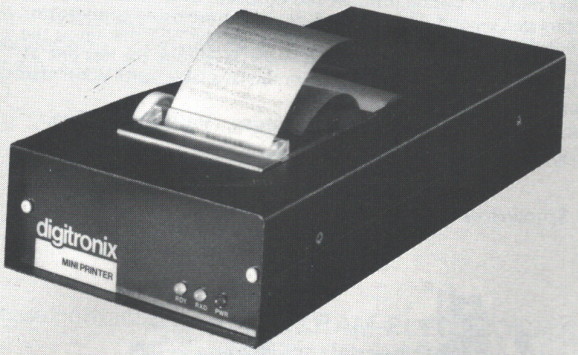
The big daddy of data processing printers make a number of down-market models suitable for use with the CBM/PET. The latest of these, the 737, must be the first dot matrix printer in its class to generate print quality good enough for text processing. In proportional spacing mode the speed is 60 c.p.s.; otherwise 50 c.p.s. The price is down down to £425.

Amongst other printers offered by Centronics is the 730 which has a 7x7 matrix and prints at 100 c.p.s. The price has been reduced to £375.

Centronics Ltd., Victoria Way, Burgess Hill, Sussex RH15 9NV. Tel: 04446-45011

Digitronix Mini-Printer £195

Is this the cheapest real printer on the market? Prices are moving so fast we wouldn't care to stick our necks out. Nevertheless, this must be



a candidate for the smallest and cheapest. It prints its 64 character set at 64 c.p.s. on aluminised paper rolls 59mm wide. That works out at 32 columns. Unlike some of its brothers, the Mini-Printer has a solid feel to it.

Digitronix Ltd., 10 Burners Lane, Kiln Farm Industrial Estate, Milton Keynes. Tel: 0908-566888.

Integrex CX80 Colour Printer — £895

That's right — colour! Seven in fact. They are accessed from a tri-colour ribbon. The CX-80 uses a 5x7 dot matrix for alphanumeric characters, and 6x7 for graphics, printing in 80 columns at up to 150 c.p.s. Needless to say this doesn't allow for true descenders or PET graphics. Colours are selected by sending 1 of 7 control codes. Data sent after this is printed in the chosen colour. Carriage Return and/or Line Feed will terminate the control code. Up to 14 characters can be programmed by the user.

Integrex Ltd., Church Gresley, Burton on Trent, Staffs. Tel: 0283-215432

Microtek MT-80P — £460

A useful new 9x7 dot matrix operating at a speedy 125 c.p.s., with 40, 80, 120 or 132 column widths. Full diagnostics and storage buffer of up to 3K are provided. We have not tested it, but print quality is understood to be quite good.

Kingston Computers Ltd., Electricity Buildings, Filey, N. Yorks. Tel: 0723-514141

OKI Microline 80 — £500 or less

Small 80 c.p.s. uni-directional printer with 9x7 matrix giving 96 ASCII characters or 64 basic (non-PET) graphics selectable under program control. Three character sizes allow 40, 80 or 132 to the line. Two ritzier models are just being launched; the 82 has bi-directional printing at 80 c.p.s., so throughput should be faster, while the 83 prints at 120 c.p.s. bi-directionally.

X—Data Ltd., Unit E, Marish Wharf, St. Mary's Road, Langley, Slough, Berks. Tel: 0753-49117

Paper Tiger 460 — £595

Surprisingly fast 160 c.p.s. bi-directional printer. Remarkable print quality (for this speed) has been achieved by using an unusual 12x9 matrix on a 'staggered column' head. This means that the dots of each matrix character overlap with a single pass of the head. There are eight software selectable print sizes. Pretty it is not. Bigger Tigers also available.

Teleprinter Equipment Ltd., 70/82 Akeman Street, Tring, Herts. Tel: 044282-4011

Seiko GP-80 — £250

A small and inexpensive unit weighing only 11 lbs. The GP-80 has a 5x7 dot matrix running from left to right at a snail-like 30 c.p.s. Up to 80 column width on 8" wide forms. Graphics, normal and double width characters can be printed on the same line. A PET interface option is said to be on its way, but was not available in time for testing. When it is, it could prove ideal for those on a limited budget. It wouldn't surprise us to see a Commodore version of this printer for use with the VIC.....

C. Itoh Ltd., 76 Shoe Lane, London E.C.1. Tel: 01-353 6090

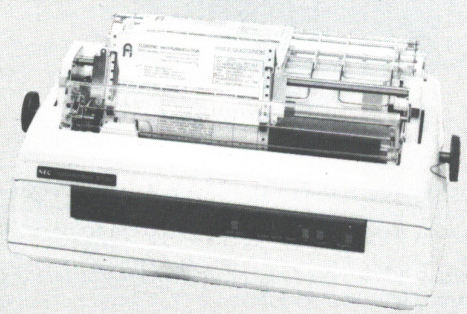
Impact Printers

Diabolo 630 — £1995 or less

Old Hades, as the 630 is known, offers quality printing from 96 character metal or plastic print wheels at speeds of between 32 and 40 characters per second. Widely used in word processing applications, it has not made quite the same penetration of the PET market as the Qume and Spinwriter, its two closest rivals. It is none the less one of the most professionally engineered printers available, with good maintenance back-up.

Geveke Electronics Ltd., RMC House, Vale Farm Road, Woking, Surrey. Tel: 04862-71337.

NEC Spinwriter



The Spinwriter has two stepper motors driven by a 4-board 8080 microprocessor controller to give horizontal print head and vertical paper movement in either direction. This feature, coupled with relative or absolute addressing of head and paper position enables printing of super- and sub-scripts, plus control for plotting. A wide choice of print thimbles is available, from normal typefaces to Greek, Russian and APL character sets.

The microprocessor enables most features to be either preset or programmable. Even the bi-directional printing mode can be turned on or off. Options include programming of horizontal and vertical tabs, forward or reverse (right to left) printing, control of form feed and form length. Switch options provide single/double line feed, 6/8 lines/inch, 10/12 characters/inch, 132/136 columns and auto return on/off, some of which have front panel override switches.

The print speed of 55 characters/sec is achieved when printing text. When spaces are required the print head skips the gap at a much faster rate - most impressive to watch. Despite these speeds the noise level is good for an impact printer, being quieter than either a Selectric typewriter or the CBM printer. The Spinwriter is ruggedly built and will accept up to 16" wide paper. It is therefore quite large (630mm wide) and heavy; about 25KG - over 50 lbs.

The cover not only lifts up but the top and sides of the cover may be readily removed for access. Inside the workmanship is typically up-market Japanese. All printed circuit boards are to a high commercial quality. Cables and looms are fitted with connectors enabling quick replacement of the modules within the unit. Safety interlocks prevent operation without the covers being in-situ to protect the print-head and drivebands from unauthorised fingers.

Provided you can obtain one for less than the list price — which shouldn't be difficult — we think that (along with the Qume) the Spinwriter is the best buy in its class.

Northamber Ltd., Great Oak House, Esher, Surrey. Tel: 0372-62071 & 01-786 2072

Olivetti DY311 — £1295 or less

As you might expect from an Italian company the DY311 is smarter than the competition. At 32 c.p.s., it is not the fastest daisywheel around, but the quality is reckoned to be excellent. This model is new and we have not yet been able to test it. We have used a similar OEM version which has provided sterling, maintenance-free service over recent months. 10, 12 and 15 pitch are supported, plus proportional spacing. The plastic print wheels offer 100 characters in a variety of type faces. For an extra £575 there is an automatic sheet feeder which will handle single sheets of paper — ideal for standard letters.

Millbank Computers Ltd., 98 Lower Richmond Road, London SW15 1LN. Tel: 01-788 1083

Qume Sprint 5RO — £1650 or less

The Qume name is just about synonymous with printing in word processing circles. The Sprint 5RO is a fast — 45 or 55 c.p.s. — daisy wheel printer that produces the most impressive results. There are now over 50 different typestyles (including Serbo-Croat) to choose from. 10, 12 or 15 pitch, monospace and proportional spacing are supported. 43 special commands give an extraordinary degree of control. Needless to say diagnostics are built-in. The printer can also be used for plotting to an accuracy of 5760 points to the square inch. Various types of feed are available. The 55 c.p.s speed version costs £100 more.

Qume U.K. Ltd., Unit 2, Bridgewater Close, Reading, Berks Tel: 0734-584640

STOP PRESS

CBM 3022 RIP?

Information reaches us as we go to press that Commodore are about to cease shipment of the 3022 tractor-feed printer to dealers. Deliveries of an upgraded model are expected within a few weeks. Other Commodore printers, including the 3023 are unaffected.

Centronics PT2 — £1215

A welcome new arrival is this 120 c.p.s., 9x9 dot matrix printer with the full ASCII and reverse ASCII character set, including PET graphics. Like most Centronics models, it gives the impression of being built to last. Access to the graphics is via a switch on the, regrettably, external interface. Bidirectional logic seeking coupled to 120 c.p.s. printing give throughput as high as 260 lines a minute. Model PT1 costs £1142 but lacks PET graphics. The £1430 PT3 runs at 150 c.p.s.

Centronics Ltd., Victoria Way, Burgess Hill, Sussex.

THANKS!

This survey was compiled and edited by Julian Allason and Robin Bradbeer from test reports by Lindsay Doyle, Newton Don, Ron Geere, Nigel West, Tommy Turnbull and Gavin Sanders. Our thanks to the many dealers and readers who told us of their experiences with different models.

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8050

A CRITICAL LOOK AT COMMODORE'S NEW ONE MEGABYTE MINI-FLOPPY

It was with a certain amount of excitement that we unpacked the 8050 disk drive for this review. After all the delays and rumours, what would Commodore's latest offering be like?

However, we controlled our impatience and sat down to read the User Manual before plugging in the drive. This unfortunately was a 'Preliminary Issue', complete with an update sheet and containing many mistakes. We also did not like the fact that the manual is intended to be used for the 2040, 3040, 4040 and 8050 disk drives. It is annoying to have to search through consecutive paragraphs for the other drives to find the one relating to the 8050.

Having said that, the manual is an improvement on Commodore's earlier attempts. It gives all the information needed by a first-time user who may know nothing about operating a computer, whilst still going into some detail on the more advanced features.

Included in the manual is a set of instructions on connecting the drive to the PET and putting it through a performance test supplied on a TEST/DEMO disk which is supplied with the drive. We have a couple of complaints regarding this disk. Firstly, the 'DOS SUPPORT' program, which is described in the manual, is called 'UNIVERSAL WEDGE' on the disk, which could puzzle a newcomer. Secondly, the manual gives a lot of information regarding sector formats, directory and BAM layouts etc., which itself is a good thing, but that section refers several times to a program which reads and writes individual track/sectors, which was not present on our disk.

A DESCRIPTION OF THE 8050

Unlike the 3040 which uses Shugart drives, Commodore have chosen Micropolis units for the 8050; these are self-aligning.

Physically the 8050 looks very similar to the 3040, apart from the drive doors themselves. A disk is inserted into the drive in the normal way, then the door is closed by pressing a handle down against a surprisingly strong spring. The disk is released by pressing the handle down again, then lifting it up.

The 8050 has three LED's on the front panel like the 3040: one (green) on each drive to indicate when that drive is in use, and one in the centre of the panel which glows green to indicate that the 8050 is switched on, and red to indicate that an error has occurred. We must confess that the first program we wrote to demonstrate the capabilities of the 8050 was to cause this LED to give a flashing red and green display!

When the drive unit was first turned on, we were greeted by a loud buzzing noise. This was traced to the mains transformer mounting bolts which had worked loose, allowing the core laminates to vibrate. An example of poor quality control. Having made that point however, the drive has worked perfectly ever since. There have been none of the disk corruption problems that marred the 2040 launch.

THE 3040 AND 8050 COMPARED

This review was done using an 8032 PET. Some of the differences and features described below are due to the 8032, some to the 8050, but we won't be making too much of this, because the comparison most people will be interested in is a 3032-3040 combination versus an 8032-8050.

So how does the new drive compare with the old and trusted 3040? The two major differences are the diskette capacity (533248 bytes as opposed to 170180 on the 3040) and the provision of the facility to use 'relative' files, which allow the user to say "read record number 15". This is a *vast improvement* on the direct access method (read track 15 sector 5) which was all that was available on the 3040. Relative files are more fully described later in this article.

The 8050 is provided with an 'auto-initialise' feature which detects when a diskette is changed, and reads the BAM (Block Availability Map) that tells the DOS which sectors are unused. The 3040 required an explicit command to do this. However, there is still no provision to lock the

drive doors to prevent a diskette being removed if a file is open, which must be a desirable feature in a turnkey application where the machine is to be operated by unskilled personnel.

On the 3040, the command to read the disk directory from drive 0 is LOAD "$0",8, which loads the directory as if it were a program, and overwrites any program already in the PET's memory. The new command is DIRECTORY D0, which does not affect the program currently in store. The directory can be sent to a printer by typing OPEN 4,4: CMD4 before giving the DIRECTORY command.

One very useful feature worth mentioning here, although it is really a feature of the 8032, is that pressing the SHIFT and RUN/STOP keys loads the first file from disk drive 0, rather than from tape drive 1. However, there is a bug in the DOS, such that it does not check the file type, so that if the first file on the directory is a data file, a 'FILE TYPE MISMATCH' error is produced, whereas the DOS should search for the first *program* as specified in the disk manual.

When writing to a data file, it is no longer necessary to suppress a line feed by typing:

```
PRINT#1,A$,CHR$(13);
```

The standard PRINT#1,A$ is now sufficient.

Error/status reporting on the 3040 is performed by means of an INPUT command on the disk error channel. The 8050 (or more accurately the 8032 PET) uses two new reserved variables: DS$ gives the error code, message, track and sector in string format, and DS gives the error code as a numeric. As well as improving program readability, this makes it possible to read the disk status in direct mode by typing PRINT DS$.

Most if not all of the 3040 commands can be used on the 8050, but the 8032 provides more convenient forms which make the BASIC program more easily readable. A version of the DOS SUPPORT program is supplied with the drive, and its commands are unchanged. Very briefly, the corresponding commands for a 3032-3040 and an 8032-8050 are as follows:

3040		8050
PRINT#15,"Idr"	INITIALISE	PRINT#15,"Idr"
PRINT#15,"Vdr"	VALIDATE	COLLECT Ddr
PRINT#15,"Sdr:fn"	SCRATCH	SCRATCH "fn",Ddr
PRINT 15,"Dddr=sdr"	DUPLICATE	BACKUP Dsdr TO Dddr
PRINT#15,"Cddr=sdr"	COPY (all disk)	COPY Dsdr TO Dddr
PRINT#15,"Cddr:dfn=sdr:sfn "	COPY (single file)	COPY Dsdr,"sfn" TO Dddr,"dfn"
PRINT#15,"Cddr:dfn=sdr:sfn,sdr,sfn..."	CONCATENATE	CONCAT Dsdr,"sfn" TO Dsdr,"dfn"
PRINT#15,"Rdr:dfn=sfn"	RENAME	RENAME Ddr,"sfn" TO "dfn"
PRINT#15,"Ndr:name,xx"	FORMAT	HEADER "name" Ddr, Ixx

where dr = drive number 0 or 1
fn = file name
s = source
d = destination
x = digit

It was very interesting to compare the 8050 and the 3040 on the point of their respective speeds in reading and writing sequential files. The results are summarised in the table below. The figures given are times per record to read or write 79 character strings, averaged over 200 records, including error checking, i.e. INPUT#15 for the 3040 and DS$ for the 8050. The times are given in jiffies (1/60th of a second).

	3040	8050
Writing	5.5	5.4
Reading	3.9	3.5
Format a disk	2mins45secs	1min20secs

The above figures show that there is really very little to choose between the two drives as regards sequential file access times, and in any BASIC program the difference would be swamped by the overheads involved in running BASIC. The timings were taken accessing the drives continuously, so that the drive motor did not stop between disk accesses.

RELATIVE FILES

These represent the major software enhancement in the 8050. In using 'Direct Access' on the 3040, it is necessary to allocate a block to the file, then record the track and sector numbers in a separate sequential file for future reference. On the 8050, this indexing is maintained automatically by the DOS, so that the user can treat the construct as a true relative file.

The programming now used to access a relative file is simplicity itself. For example, to read the tenth record in the file, the following routine is used:

```
RECORD#1,10    :REM SETS THE FILE POINTER TO
                   RECORD 10
INPUT#1,A$     :REM READS RECORD 10
```

To specify a variable in the RECORD statement, the variable must be enclosed in parentheses: RECORD#1,(RN%).

If the record number given in the RECORD statement is higher than the last record in the file, then a "RECORD NOT PRESENT" error is generated. If this is followed by a PRINT #1,CHR$(255); then the file is extended automatically. This is in fact the technique used to create a new relative file. For example, to create a file of 800 records,of length 200 characters on drive 0:

```
DOPEN #1,"FILE",D0,L200
RECORD #1,800
PRINT #1,CHR$(255);
```

To create a file of that size took a shade over 2 minutes.

Owing to the structure of a relative file, it is limited to 182880 characters in length (the maximum record number is 65535), which means that in any respectable business application, the Name and Address file, or Product file, will need to be split into sections. This is not a serious drawback, but nevertheless it is inconvenient.

As regards reading and writing relative files, we wrote a small program to access records at random, and obtained the following timings, which are average figures again expressed in jiffies per access. The file consisted of 800 records of 79 characters:

	Relative File Access Times
Writing	35 jiffies
Reading	15 jiffies

CONVERTING 3040 DISKS TO 8050

As it is certain that some existing 3040 users will want to transfer to the 8050, Commodore have supplied, on the TEST/DEMO diskette, a program to copy programs from 3040 to 8050 (and back again). This involves having a 3040 and an 8050 connected to the same PET. When the copy program is run, it changes the device number of the 8050 (don't worry, it reverts to 8 when the drive is next turned off!) to enable the PET to address the 8050 and 3040 separately. The program then prompts for input and output device numbers, drive numbers, and the file name.

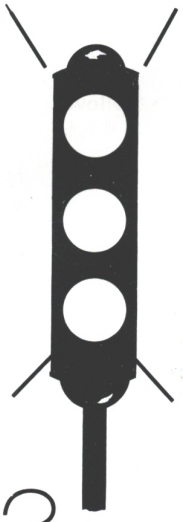
RELIABILITY

No problems were encountered during Test, but considering the brief period of time available, it would be unrealistic to make any comments about reliability: that will have to wait until a number of drives have been installed for a significant period of time. Commodore say that their revised recording format will greatly improve data integrity, but only time will tell. However, the 8050 manual recommends the use of standard single density floppies, on what we would call (at least) a triple density recording system; we would regard this as a doubtful practice.

CONCLUSION

The 8050 has at last arrived and seems to perform very well. By sensibly making available the 4040 ROM set, Commodore have made it possible for 3040 owners to upgrade. Unless desperate for extra capacity, we think it more sensible to do this than take a low trade-in against an 8050. First time buyers would be well advised to spend the extra £200 and go for the 8050.

what's red green and beeps?



Patience, friends. The answer follows shortly. In the meantime, how many of you disk users have found sympathy with criticism levelled at CBM's 2040/3040 disk unit, regarding its error light? And, indeed, regarding its total absence of other little lights to tell you it's powered?

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Calco Software

Lakeside House Kingston Hill Surrey KT27QT
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Perhaps we'd better be a little more clear, so that everyone can join in. The disk unit has, in fact, three tiny red lights on its front. All of them wink prettily for a second or so after turning the thing on, a process achieved by reaching round to the back and locating a small rocker switch. And anyone who can unerringly remember now, without going to look, which way the switch rocks for "on" and which for "off" gets a Gavin Gold for being smarter than your average disk user.

Moments after switching on, however, the little lights go off. The right and left ones only come on after that when either disk drive is activated, while everyone hopes the centre one won't be seen again, for it signals an error.

In other words, there's no permanently-on light to tell you whether the disk unit is powered up. Only groping for the rocker switch at the back, sensing its position with programmer-calloused finger-tips, and exercising your own fallible memory will tell you that. So that's one snag.

There's a far worse one though. Little lights tend not to make a noise when they come on. Silent as the grave they are. This doesn't matter very much for the right and left lights, because their state is accompanied by a much more obvious indicator that their drive has begun operating: you can hear it. Better, each drive tends to sound slightly different, so you even know without looking which one is spinning. None of this holds good for the error light. It sneakily and silently comes on when some sort of naughty condition occurs, but it's perfectly possible for you to carry on happily doing whatever it is, sometimes disastrously, with an error condition in residence quietly waiting for you to fall over it.

More Heat than Light

Perceptive users, when the ill-starred 2040 first made its appearance, quickly remarked on the latter phenomenon. Mind you, they had every reason to, because the 2040 was in error almost as often as it wasn't. Heat was the major problem, but there were other glitches too. And the sneaky error light's position didn't help. CBM had cunningly recessed it slightly, to make it even harder to see. Not that it's that luminous in a brightly-lit room anyway. So, everyone said, what a damn silly idea. And they weren't far wrong.

The same arrangement of lights still exists on the 3040, and presumably will too on the just-released 4040 also. The number of times errors occur has markedly diminished, but the only sign you'll get when they do happen is that teeny silent light. And you'll still have no indication at all of whether the disk drive's on or off.

Until now, that is. Which brings us to what's red or green and beeps.

It's a little add-on circuit board for your disk unit, that's what. Marketed by Adda Computers of 14 The Broadway, West Ealing, London W.13, it gets my highest rating this year for plain old-fashioned value for money, coupled with genuine usefulness. But, I hear you asking, what is it exactly, and what does it do, and is it hard to fit, and how much does it cost? Stand still for a minute and I'll tell you!

First, it'll cost you just £14.95 + VAT which isn't likely to break you, even in these hard times. Second, what you get for that is a small printed circuit board, complete with a small plug fitting; a long thin lead, also wired to the board, at the end of which is a little light; and a set of fitting instructions. Third, fitting it couldn't be simpler. It took me less than three minutes, and all I needed was a Philips screwdriver to open my disk drive.

The board plugs straight on to an *in situ* board at the top rear of the unit, and the little light at the end of the long lead clicks in to replace the existing red error light. From then on, you're in business.

Son et Lumiere

What does it do? Two things, basically. One, it gives you a permanent "power-on" indication on the front of your unit. This is because the new light glows green all the time the disk drive is on. Which is terrific, because I've lost count of the number of times previously that, at the end of a long and late programming session, I've forgotten to switch the disk drive off, only to find it worryingly warm the next day. No more. The green light has ended all that!

Two, the new board gives you a visible *and audible* warning of an error condition. Visible, because the green light cleverly changes to red if an error occurs. Audible, because the board you fitted has a tiny speaker as an integral part of it, and this busily beeps as soon as an error crops up. The beep isn't loud - it has the same well-mannered tone possessed by the better electronic alarm watches. But it's effective, by gosh, and the whole thing gets my vote as the best little add-on for disk users I've seen in 1980. Why, it even says in the instructions that you can deliberately include lines in your programs to activate the warning under certain conditions. I haven't gone that far yet - I'm happy enough to know whether I've turned my disk drive off or not, and to hear as well as see any errors that come up.

I know I've used a lot of space up on this item, but when I find a good thing I really enjoy passing the word on. And this *is* a good thing.

A COUPLE OF QUICKIES

Because I *have* used up a lot of space, I only have room now to pass on one programming tip, and to suggest another. My apologies therefore for the first Sanders feature to have only two items, but I hope disk users will think it's been worth it, and others will like what follows.

The pass-on tip first. Somewhere from way back, I jotted this one down in the notebooks I scribble bright ideas in. I have no note of whence it came, so my apologies to the bright but anonymous programmer who thought it up. I've used it several times, and you may find it helpful too.

It concerns that ever-present problem connected with neatly lining up numbers in a column, when the numbers are of varying lengths, none of which is known in advance. Various ways of doing it have been given in the past, but I like this one because it's a one-liner.

Here's how you do it. First, you need to decide how long the longest number is likely to be, and give that length a variable to itself. Let's say you reckon your longest result will be 8 digits. We'll make R=8 and, armed with that, you need only one other variable to be set. This is to make C=LOG(10). You needn't necessarily use C, of course; employ any letter you want. Your one-liner will look like this:

```
PRINTSPC(R-INT(LOG(ABS(N))/C));N
```

N is always the number you want to line up, and the program line would normally be in a subroutine you'd go to whenever N was known and ready to be printed. Try it; you'll like it.

Pressing Business

Now here's the suggestion. I don't know if you're anything like me, but I get a bit tired of programs that invite me to press "G" (let's say) to go to the next step, when I know damn well that pressing any key will usually achieve the same effect. Equally, an invitation to "PRESS ANY KEY" is irritating because it seems imprecise or worse, might even lead to RETURN or STOP being pressed. In fact, next time you come across the latter request, and if you don't mind dropping out of the program, try pressing RETURN or STOP. I'll give you 2 to 1 the programmer didn't provide for people who'd be innocent enough to actually press *any* key!

And there's another interesting thing connected with the "PRESS ANY KEY" thing too; just watch over the shoulder of any non-computer user confronted with that request. It instantly provokes a nervous inner debate about *which* key to press. This one? Or maybe that one? Or possibly this one here .....

Well, there's a quick and easy way round all these problems. It eliminates RETURN and STOP key hazards (without disabling them), and is clear and concise. How? Simply use the WAIT function. The best one is WAIT 59410,4,4 which stops the program stone-dead until the space bar is pressed.

The most sophisticated way of using it is to build a 3-line subroutine at the very end of your program, which gets called whenever the program needs the sort of break previously provided by "PRESS ANY KEY". The first line in the subroutine is a PRINT statement which starts (after the opening double quote, of course) with a Home Cursor, followed by 24 Cursor Down and 9 Cursor Right characters, then a Reverse On and a blank space, then the words PRESS SPACE TO GO ON, followed by another blank space and Reverse Off, before the closing double quote. Very important though: follow the closing quote with a semicolon.

The subroutine's second line is WAIT 59410,4,4 and the third is RETURN. The point to which the program returns should normally be a Clear Screen command, to avoid any nasty scrolling effects. Again, try it out. You should be happy with the result.

And that's all for this time, hackers! Have a good month, a terrific Christmas, and a marvellous New Year. See you in 1981 !

Gavin

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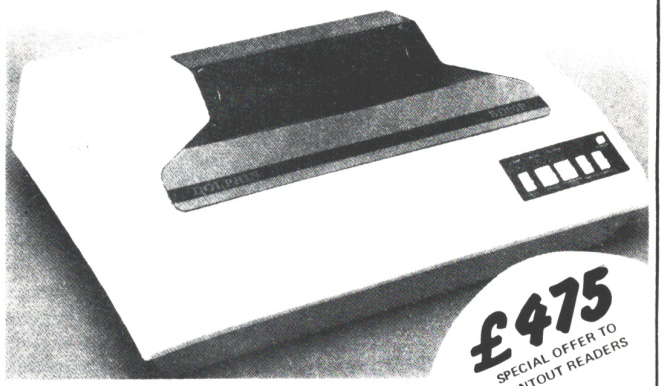

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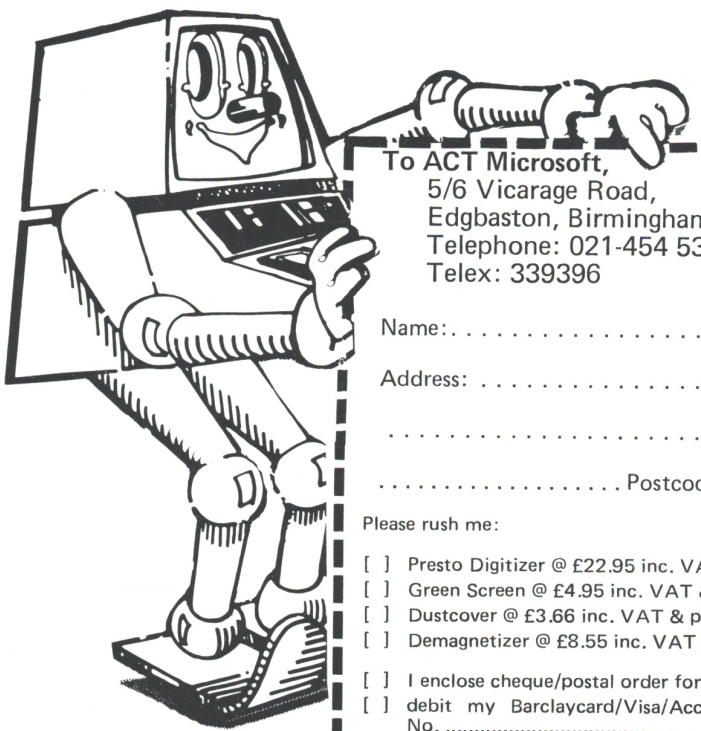

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BBDOS

by Terry Hope

TRUE RANDOM ACCESS AT LAST?

Random access files have previously been very hard to handle on CBM disk drives. Now B & B Computers say they've changed all that. It sounds like a breakthrough. We've checked.

Before going any further, we'd like to say "sorry" to those PRINTOUT readers who'll find the beginning of this review - a general description of disk operating systems, sequential files and random or direct access files - to be very familiar ground. It's simply that our postbag constantly shows that many readers (including some who actually own disk units) don't know too much about these things, and aren't sure how to find out - though they'd certainly like to. We therefore felt that a review of what could be a vastly improved DOS for PET would be at its most meaningful if we prefaced it with a fairly basic summary of the area of operations which the reviewed product set out to make easier.

First then, let's be clear about what a disk operating system is (almost always called DOS for short). A disk unit needs a disk operating system so that, hopefully, it'll be able to do all the things you're likely to want. At rock-bottom, that's going to be saving and loading programs. A bit further up the ladder, and without giving you a learning headache, your DOS should be able to handle what are called sequential files. At higher levels of sophistication, whatever DOS you have should let you set up, maintain and manipulate random access files (sometimes known as direct access files, for reasons which will be obvious in a moment).

Lightening Loading

Lots of people are content to stay with simple program loading and saving operations, their happiness stemming from the speed with which disk units can do this. And, of course, they *are* very fast indeed - especially when compared with the other basic method of storing and retrieving programs, that of using tape cassettes. The disk operating system looks after the process involved in putting programs on, or retrieving them from, disks, provided you talk to DOS in a language it understands. But to restrict usage of a disk unit to its most low-key function is akin to using PET as a simple adding machine its full potential isn't being realised.

Thus disk unit users sooner or later have a go at sequential file handling. If they have a CBM disk unit, they have a bit of a problem in learning the operations and DOS commands, and generally getting the hang of things, but it's not too bad. Sequential files consist of data likely to be wanted by a program running in PET. They might be almost anything and their content needn't concern us here.

What is of interest (and eventual dismay, as daylight dawns on the user) is the fact that when, via the disk operating system, PET calls on the disk to supply some data from sequential files, the disk unit has to start at the first and read through every one until it gets to the one it wants, and then read through that for the required information. In other words, apart from the high reading speeds, it's back to tape cassette operations again where, with more than one program on the cassette, the unit needs to read through a whole lot it doesn't want to find the one it does.

Random Access

To be sure, it doesn't take *that* long on a disk unit to start at the beginning and read through every single data file until the required one is found. But that leaves aside the question of whether a particular piece of information is needed, embedded in that particular file, and if the name of the game in computing is speed (and it is), then the waste of time is unacceptable. Which is where random access (or direct access; it's the same thing) comes in.

Random or direct access files consist, as do sequential files, of a number of records. There's always a top limit on the number of records which can be held on a disk, and the length of each one, but these limitations are no real problem. The whole thing is then set up in such a way that PET's program can issue a command, via the resident DOS, which sends the disk unit direct to the required file *and record*, wherever it may be on the disk. There's no time-wasting search of unnecessary material; simply a direct program command which leads to a direct access. Very fast, very efficient, and very hard to do with the Commodore 3040 disk unit and its normal DOS. It's not impossible, mind you, but the direct access instructions which have to be issued to accomplish it are unique to CBM and incredibly long (in that they have little or no relationship to the style or length of commands in any other disk unit's DOS).

Solving Commodore's DOS Problems

Since random, or direct access, file handling is using a disk unit at its most efficient, it's not surprising that quite a few people have wrestled with the problem of simplifying the process for the CBM disk unit. There's been some success, but it seems to us that the current BBDOS offering has virtually cured all the previously intractable DOS problems outright.

However, it's important to make one point right away: BBDOS does *not* replace the existing Commodore DOS, nor does it make any alteration to it. What it *does* set out to do is make the setting up and operation of random access files very much more simple than it has been before, using only the CBM DOS. And anyone who's tried to use random access with CBM's DOS will know how much that means!

BBDOS comes as a ROM which plugs into one of the empty sockets on PET's main board (normally $9000, but B & B tell us they can customise the ROM to go in any of the empty sockets if $9000 clashes with an existing chip), and is activated with a standard SYS call. From that point, all of the additional commands provided by the ROM are available either directly from the keyboard, or from within a program. Those commands are very similar to those in other microcomputer DOS systems (such as CompuThink), and allow individual records of any random access file to be accessed and manipulated. BBDOS random access files can be of any number of records up to 32,767 and each record can be up to 254 bytes long. No surprises there, but a considerable degree of comfortable familiarity!

Directory Enquiries

Access to each random access file record is obtained by using a unique number, and a directory file is maintained with enough space for 10 entries, so that a maximum of 10 random access files can be held on one disk. The directory itself is actually a standard 3040 sequential file, which means there's no interference with the directory structure, and compatibility with existing files is maintained. The directory holds information which BBDOS uses to convert the records of any specific file to the exact track and sector on the disk at which the record is.

In practical terms, opening random access files, writing them, reading them, and closing them couldn't be more simple.

It's important, of course, to format any disk correctly first, but as soon as that's done (and BBDOS provides a utility program for the purpose), opening a random access file is achieved with the simple command:

$0,DN,AC$,FN$,DI$

▷ 35

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In this command, DN is the drive number; AC$ is *always* "D" (and should be set as a string near the start of the program); FN$ is the file name; and DI$ is the directory information.

Read/Write

Writing a record is even more simple - $W;RN,WD$ where RN is the record number and WD$ is the write data. Reading a record is similar - $R;RN,RD$ with RD$ standing for the read data. Closing a file is about the simplest of all. Simply use $C.

Without getting into a lengthy explanation of random access file handling and methodology (which, despite this review's opening preamble, really *is* outside our present scope), it's really quite hard to know what else to say about BBDOS. Those of our readers who are familiar with other, and much more easy to use, disk operating systems than CBM's will already have recognised, with happy familiarity, the parallels between BBDOS and other systems. Users familiar with the beautifully simple CompuThink approach may even be happy to hear that BBDOS has exactly the same string anomaly problem. Let's clear that up immediately though, in case it worries those who might just be thinking of getting their feet wet with random access files for the first time.

One Small Snag

When BBDOS reads from a random access file, it puts the data string it reads into a protected memory buffer area, and modifies the variable table pointers so that they point at this buffer. This produces one small snag if a number of records are read, one after the other, to become different string variables (a name is read and becomes N$, for example, followed immediately by a phone number, which becomes T$). If several records are read like this - and they often are - they'll all point at the same buffer area, and so all become equal to each other. Which can be a bit disconcerting!

The solution, happily is very simple, though a little odd. In the example above, you would merely arrange for your program to read N$ and then go on immediately to say N$=N$+" ". That forces Basic to push N$ into the string holding area in memory, so that you can then go ahead and read T$ (remembering that, if you plan to read another record after T$, the process should be repeated).

Conclusion

We've been using BBDOS for some weeks now, on an extended test, under a number of random access file conditions and we're very happy to report that we've had no snags of any sort. We should also say that we were using an early version of BBDOS (Version 2.1) which has now been overtaken by Version 2.2. This allows more than one 3040 to be used, and has one or two other advantages also. And we hear that B & B Computers are actively looking at the possibility of implementing BBDOS for the 80-column PETs too.

All in all, if random access files have been a nightmare for you, or if you've always wistfully wanted to use them but found it all too much of a hassle, we're happy to recommend BBDOS as being all that it says - an easy road to the random highlands!

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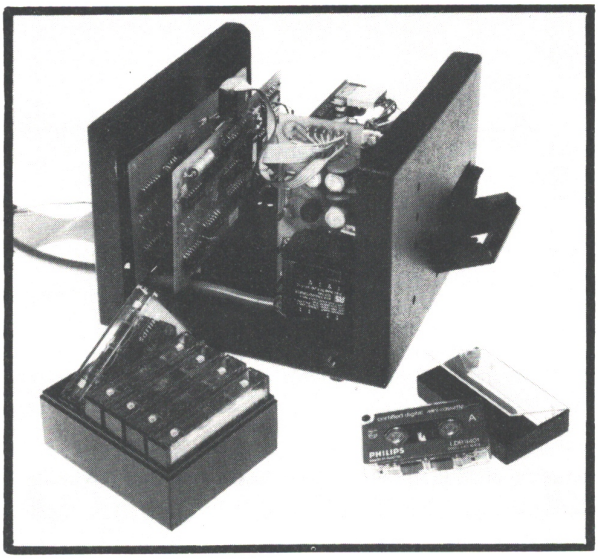

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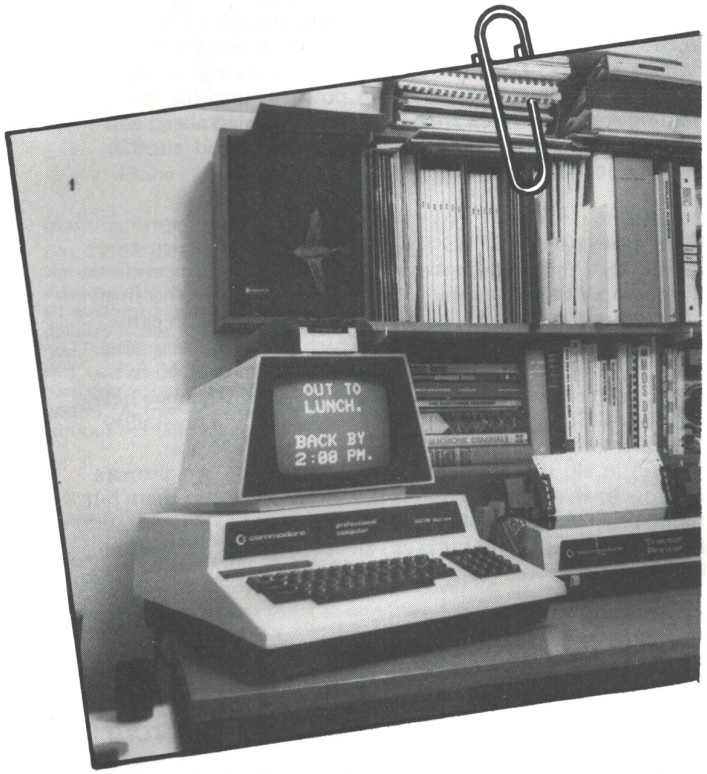

fast graphics

by Lindsay Doyle

In this installment I will take a giant step into the subject of fancy displays by introducing the Fast Graphics techniques developed by Warren Swan.* Although these use machine language, you will not need any machine language background to understand and make use of them.

FAST GRAPHICS, WHAT ARE THEY?

There are five effects in this bag of tricks and as far as the human eye can see, they happen instantaneously. BLANK clears the screen like CLEAR, but unlike CLEAR, the entire screen contents is retained and will be instantly redisplayed when the function is called again. This is equivalent to POKE 59409,52, the old ROM screen blank instruction which, as you may know, does not work with new ROMs. A simple modification to the PCB circuitry will be described, however, which, with a toggle switch added to the back panel, will allow you to use BLANK with new ROMs as well as with old. If, being equipped with new ROMs, you prefer not to get into the hardware modification business, read on in any case, as the other four effects do not require it.

The second effect, which I shall call FLIP, exchanges the entire screen contents for the contents of another 1K of RAM which has been rendered inaccessible to being inadvertently overwritten by BASIC. This allows you to flip back and forth between two pictures. One may be in upper case and one in lower case if desired.

The third effect, called FILL, fills the screen instantly with 1000 repetitions of any selected character. The fourth effect is called INVERT because it converts all normal characters to reverse and all reverse characters to normal. The final effect allows you to scroll down when printing off the top of the screen just as easily as you would normally scroll up when printing off the bottom of the screen. I shall call it SCROLL for simplicity.

THE TECHNIQUES

Even if you aren't familiar with machine language, you're probably aware that it is orders of magnitude faster in operation than BASIC. This is the reason that it is commonly seen in use in such games as LIFE and QUBIC (4x4x4 Noughts & Crosses) in which complex and lengthy search patterns are required. Sometimes the machine language is "invisible": a program can be LOADed, but when you LIST it, nothing appears but the SYS command which sends the computer out of BASIC into machine language at the given address. The first tape of this type which I received I thought was faulty, so I recorded over the invisible program, much to my chagrin when I discovered the truth! Such misunderstandings could be prevented by including a few lines of REMarks in BASIC before descending into what I shall henceforth refer to as ML for convenience.

Other ML programs are written in BASIC with the ML text included in coded DATA and instructions incorporated which read the data and write it into the desired memory locations. This is the technique used by Warren Swan.

Where to write ML? There are two places more worthy of consideration than any other. The first is at the top of memory. If you use this area, you must "protect" it by fooling the computer into thinking that the top of memory is lower than it really is. Otherwise your ML might get trampled on by BASIC in the course of a program which had a tendency to fill up the entire memory. The other place more worthy of consideration is already protected and is the universal first choice for this use if it is found to be large enough, which it is in our case. The is the buffer area reserved for the second cassette. Speak for yourself, but I have never seen a PET installation which had two cassette drives. Like the TV adaptor plug on the back of the radiogramophone, which some of you oldsters may admit to remembering, it makes for good advertising, but gets no more use than the fins on a Cadillac.

PREPARING YOUR COPY

There are two programs appended: the first is the loader, which the limitation of sixteen characters to a title forces me to name LOADFASTGRAPHICS. The second is a demonstration program which I have imaginatively titled DEMO–FASTGRAPHICS. Don't call them FASTGRAPHICSDEMO and FASTGRAPHICSLOAD! Why? Because if you do that, you can hardly abbreviate at all when you go to call them up, whereas with my names you can differentiate the two by the first letter. This may seem obvious to most of you, but I find that a large number of professional program writers, so-called, haven't figured it out yet.

In order to cater to either new or old ROMs, I have incorporated the codes for both in the LOAD program. As you transcribe it, you must delete the unwanted code and punctuation as explained in the REMarks. You might think that I could have worked out a conversion algorithm, but how am I to explain to the machine that it must convert 134 to 52 sometimes but not always? Don't delete the division signs, exclamation marks, asterisks, etc. They are neither typographical errors nor Victorian decorations!

When you have made your tape or disk copy of these two programs, I guarantee that you will have incorporated at least one error and that it will be very difficult to find. The best way I know of to check massive bunches of DATA statements is to get an assistant to read them out to you while you check them off, never taking your eyes from the display. Do it twice. When you're satisfied that you have perfect copies, load and run the LOAD program. After a few seconds, the READY display shows that the LOAD program has now done its job and hidden itself in the second cassette buffer space. You may now load and run the DEMO program or any other program which calls up the effects. Like a modern marriage, they will remain operable until power off unless interferred with.

VOIDING YOUR WARRANTY

If you have new ROMs, as we so innocently called them, little wotting that there loomed in the near distance another

and perhaps yet another set, you must make a hardware modification if you wish to use the BLANK effect. However, the DEMO program is designed to work without it. This modification, which is diagrammed in Fig. 1, consists of cutting one trace on the PCB, mounting a miniature SPDT toggle switch, and soldering three wires to it and the points identified on the PCB. If you are capable of doing this, you don't need

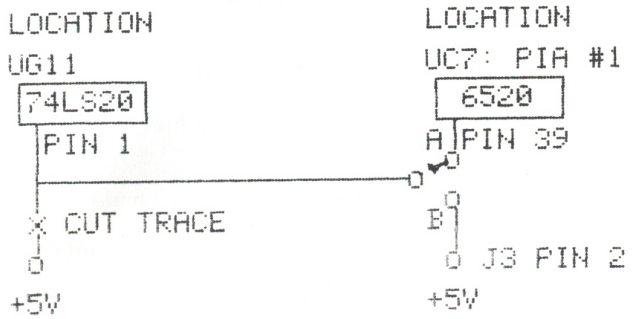

FIG.1: HARDWARE MODIFICATION TO GIVE VIDEO ON-OFF FUNCTION ON NEW ROMS.

any further instructions from me, especially not a lot of prissy remarks about not letting any drill cuttings fall in the works to get caught under the chips. The toggle switch allows you to blank and unblank in position A by calling POKE 59409,52 and 59409,60 respectively or by using FASTGRAPHICS. In this position you are interfering with certain possible uses of the PIA chip, so if you want to be sure that all your IEEE peripherals are not affected, you must switch to position B when you are through with FASTGRAPHICS. Some of you may have seen this fix in a simpler form in that many-editored house-organ CPUCN, where it was credited to Bill Williamson of Leicester University. I have added the toggle switch to make it reversible.

SOME USES FOR FASTGRAPHICS

Use BLANK to hide what is going on while you are building up a picture using the old-fashioned slow techniques. Or use FLIP instead. Simulate motion by FLIPping between two pictures. Use SCROLL to move pictures down and PRINT to move them up. Don't expect to recover them from beyond the screen, though, as things stand now. Use INVERT as an attention-getting device, or to hypnotize your friends. If you have a program which draws large letters on the screen, the effect of sequential applications of INVERT is devastating. It also eases tremendously the preparation of complex reverse displays such as maps of caves and the like. Use FILL to spell out messages, letter by letter or for backgrounds on which other images may be formed. Study Warren's examples to see how fascinating some of the possibilities are and to get new ideas. Note in particular the effect of switching interlocked effects such as upper and lower case on alternating normal and reverse lines of text.

APPLICATION HINTS

LOADFASTGRAPHICS can be set up as a subroutine and incorporated in your own program. If you have Toolkit or the Programmers Friend, you can easily renumber it and append it to an existing program. Those skilled in the art can load it into the second cassette buffer and then record it from there in ML form. Reference to line 130 of DEMO–FASTGRAPHICS will remind you of the necessary addresses for calling up the various routines with SYS. Note, however, that FILL uses USR, not SYS. Call it up with A=USR(X) where A is any unused variable and X is the character code (0 to 255) of the desired character including normal and reverse as well as upper and lower case, four codes to each key.

```
100 REM:LOADFASTGRAPHICS BY WARREN D. SWAN  FROM PUN VOL.2 #1.
110 REM:RENAMED AND WITH MODIFICATIONS FOR NEW ROM ETC. BY L.DOYLE 8/80.
120 BASE=826:REM:LOAD INTO 2ND CASSETTE BUFFER.
130 REM:DATA IN PARENTHESES ARE FOR (OLD,NEW) ROMS RESPECTIVELY. FOR EACH PAIR,
140 REM:SELECT DESIRED CODE AND DELETE PARENTHESES AND OTHER CODE.
150 REM:BLANK
160 DATA/,173,17,232,73,8,141,17,232,96
170 REM:FILL
180 DATA/,32,167,208,160,0,132,32,162,128,165,(180,98),134,33,145,32
190 DATA200,208,251,232,224,132,208,244,96,3,2,73,255,240,249,96
200 REM:INVERT
210 DATA/,162,128,160,0,132,33,134,34,177,33,73,128,145,33,200
220 DATA208,247,232,224,132,208,240,96
230 REM:SCROLL
240 DATA/,32,0!,160,40,132,34,160,0,132,32,160,191,162,131,134,33,134
250 DATA35,177,32,145,34,136,192,255,208,247,202,224,127,208,238,160,39,169,32
260 DATA145,32,136,16,251,76,0!
270 REM:FLIP
280 DATA/,162,0,169,(147,65),240,11,165,(135,53),56,233,4,133,(135,53)
285 DATA169,12,129
290 DATA(134,52),32,0!,161,(134,52),172,76,232,141,76,232
295 DATA152,129,(134,52),164,(134,52),200,132
300 DATA32,134,34,160,0,166,(135,53),134,33,162,128
305 DATA134,35,177,32,72,177,34,145
310 DATA32,104,145,34,200,208,243,230,33,232,224,132,208,234,173,3*,32,210
320 DATA255,140,3*,76,0!,/:#.9
330 B=BA:I=0
340 READN$:IFN$="#"THENREADN:N=BA+N:GOSUB420:POKE1,L:POKE2,H:GOTO410
350 N=VAL(N$):R$=RIGHT$(N$,1):IFR$="/"THENB=B+I:I=0:N=B:GOSUB420:GOTO390
360 IFR$="*"THENN=N+B:GOSUB420:POKEB+I,L:POKEB+I+1,H:I=I+2:GOTO340
370 IFR$="!"THENN=N+BA:GOSUB420:POKEB+I,L:POKEB+I+1,H:I=I+2:GOTO340
380 POKEB+I,N:I=I+1:GOTO340
390 N=LEN(N$)-1:IFN>23THENN=23
400 GOTO340
410 END
420 H=INT(N/256):L=N-H*256:RETURN
430 STOP
```

```
100 REM:'DEMOFASTGRAPHICS' BY WARREN D. SWAN FROM PUN VOL.2 #1.
110 REM:TITLE CHANGE AND MINOR MODS BY L.DOYLE 8/80.
120 REM:'LOADFASTGRAPHICS' MUST BE RUN FIRST.
130 BASE=826:BLANK=BASE:INVERT=BASE+40:SCROLL=BASE+63:FLIP=BASE+108:CASE=59468
140 REM:FILL BY A=USR(DESIRED CHAR.#).
150 POKE CASE,12:A$="FAST GRAPHICS BY MACHINE LANG. ROUTINES
160 PRINT"□":FOR I=1 TO 25:SYS INVERT:SYS SCROLL:PRINT"#"A$:NEXT:GOSUB 290
170 GOSUB 250:A$="-AST IRAPHICS BY :ACHINE LANG.■ -OUTINES"
180 SYS FLIP:POKE CASE, 14:GOSUB250:FORI=1TORND(1)*10+20:SYS FLIP:GOSUB 280
190 NEXT:FOR I=0 TO 255:A=USR(I):GOSUB 270:NEXT
200 A=USR(RND(1)*256):FOR I=1 TO 24:SYS SCROLL
210 GOSUB 270:NEXT:PRINT B$:FOR I=1 TO 24:PRINT:GOSUB 270:NEXT
220 RESTORE:POKE CASE,12:FOR I=1 TO 4:FOR J=0 TO 7:READ B(J):NEXT
230 FOR K=0 TO 23:WAIT 59456,32,32:A=USR(B(RAND7)):FOR W=1 TO 20:NEXT:NEXT:NEXT
240 GOTO 130
250 T$="■■■■■■■■■■■■■■":B$="■■■■■■■■■■■■■■■■■■■■■■■■■■":PRINT"□":SYS INVERT
260 FOR I=1 TO 13:SYS INVERT:PRINT LEFT$(T$,I)A$LEFT$(B$,26-I)A$;:NEXT:GOTO 290
270 FOR J=1 TO 100:NEXT:RETURN
280 FOR J=1 TO 200:NEXT:RETURN
290 FOR K=1 TO 333:NEXT:RETURN
300 DATA 101,84,71,66,93,72,89,103
310 DATA 100,82,70,64,67,68,69,99
320 DATA 103,89,72,93,66,71,84,101
330 DATA 99,69,68,67,64,70,82,100
```

*Mr. Swan, whose address is 15933 S. Grove Ave., Oak Forest, Il 60452, USA, offers a free list of programs for sale, but has been kind enough to give me permission to reproduce the concepts first disclosed in Vol.2 Issue 1 of the much-beloved but now defunct American PET User Notes.

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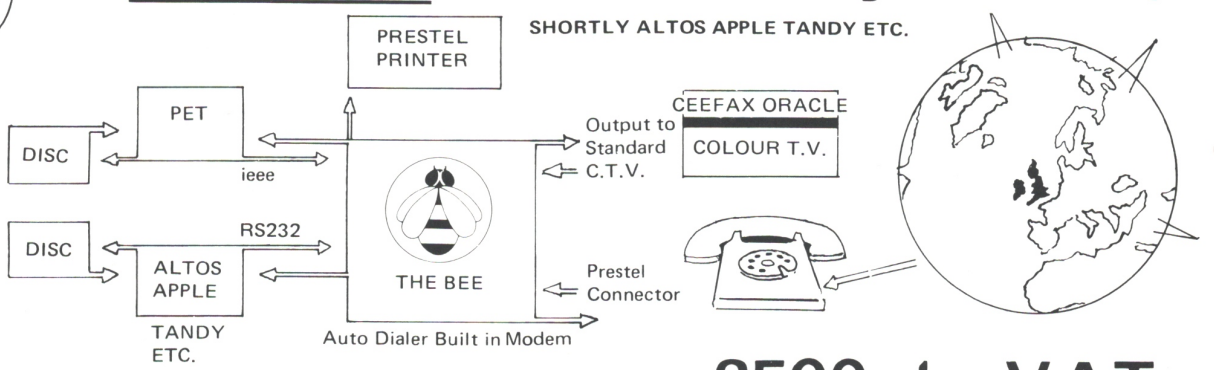

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Which is why Personal Software's Birth Control program suite is such a surprise. But more of that later. First, a description of what you get for your £14 + VAT.

Attractive Presentation

As with all of Personal Software's current packaging, the software is very attractively presented. The box includes a 16-page booklet, the front cover of which forms the front of the box also, since it's visible through a large cut-out on the box front.

Inside, there appears at first sight to be no less than three program cassettes involved. Though clearly there's no deliberate attempt to mislead, be careful at this point. More than a cursory glance at the contents shows that one cassette is audio only; one is for the TRS-80; and one is for PET, and the reverse of one caters for Apple users. The audio cassette doubles as a sound guide for either computer.

We're told that Personal Software find it cheaper quite literally to give away a software cassette (TRS-80, PET or Apple, according to which computer you haven't got), than set up separate packages containing two cassettes only, one audio and one software, for PET, Tandy, or Apple users. We have no reason to suppose they don't know what they're doing.

The Birth Control programs are part of what Personal Software call the Vitafacts series. These are said to be health education programs, "Designed so you have fun while learning". The phrasing is perhaps fractionally unfortunate in the context of birth control programs, but we'll not cavil at it.

A Helpful Booklet?

The booklet with the Birth Control programs is, as with all Personal Software products, well designed and printed. The text stresses at the start that no program in the Vitafacts series is a substitute for the personal assessment and guidance that you should seek from your doctor.

This perhaps is not surprising, since only four and a half pages of the 16 in the booklet are given over to birth-control material, and two and a half of those are a medical glossary. It then says that the programs it accompanies, and others in the series, were approved and endorsed by the College of Family Physicians of Canada.

We find that astonishing, but we're getting ahead of ourselves again.

The approach then adopted is to ask the user to listen to the audio cassette (you did know, before you bought the programs, that you had to have an audio cassette player? No? Too bad!). On the cassette, you hear three couples with a problem: Joey and Linda, unmarried high school seniors; Jim and Louise, married and in their mid-20s; and John and Betty, who've been married 20 years. All three couples have the same problem: an unexpected baby on the way.

The audio cassette is American and the dramatised opening, introducing the couples, is somewhat soap-opera. Then a serious and high-speed narrator takes over, who literally deluges you with facts and statistics, all related to birth and birth control.

In fact, he takes over three times, because after he pauses (maybe to take breath), you're invited to load the first program (and subsequently the second and third programs) and try out your new-found knowledge. And that's where things begin to come unstuck.

Very Basic Programming

The programming is good enough (with one exception, which we'll come to in a moment), though very basic (with a small "b"). The programs either pose questions with multiple-choice answers, the questions being taken at random from a bank held in the body of the program, or ask you to say "true" or "false" in response to statements. The snags lie in curiously misleading inaccuracies which occur, and in the junior humour employed in some multiple choice answers.

As an example of the former (and readers with delicate susceptibilities may care to skip the balance of this and the next paragraph), one question says: "If you are a woman, you have three external sex organs", going on to give two alternative answers. The correct one (and the only correct one, since the other is demonstrably and clearly wrong) names the three external organs as the breasts, vagina and vulva. It's unlikely that female or male readers will need us to tell them that the vagina is not external. The program, incredibly, says it is (but the booklet, on the other hand, makes it clear it is not).

Juvenile Humour

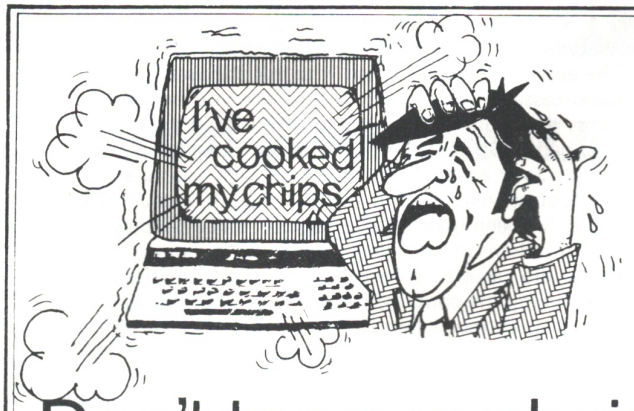
Examples of fourth-form humour abound in the multiple-choice questions: two examples will suffice. In asking what a vasectomy is, one choice provided is 'A suburb of Moscow". In asking what the rhythm method of birth control is, two of the choices provided are, respectively, "making love with music" or "moving rhythmically".

If the College Of Family Physicians of Canada endorsed that sort of error and/or that sort of humour, you may feel they need their collective medical heads knocking firmly together. This set of programs either is or isn't a serious attempt to teach a serious subject. If it is, then the juvenile humour is misplaced to say the least. If it isn't, then the humour could have been rather more subtle than it is. Currently, it has all the delicacy of masonry falling through a skylight.

As far as the programming of the screen presentation is concerned, we also have reservations. Not serious; rather more puzzled (again) that Personal Software should be the name behind it. All questions and answers are in upper-case, for instance, with no line spaces. Since the amount of space used for any question and answer is seldom more than four or five lines, why on earth (if the programmer is dead set against lower-case) weren't line spaces used?

Judging Value and Worth

Finally, in judging the value and worth of the programs, we have to ask ourselves one very important question: for whom was this alleged instruction intended? It doesn't seem illogical to assume that one or more of three audiences might have been in mind, based on the archetypes used in the dramatised opening to the audio cassette. These would thus be the high-school junior level; the relatively newly-wed mid-20s; and/or the more senior couples with twenty or so years of married life behind them.



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Birth Control

We therefore tested the programs on all three types, but we especially concentrated on the younger people, since the consensus seems to be that they're the group most at risk. And we have to say that no one had any problem in scoring around 90% without either reading the book or listening to the audio cassette.

Ribald Laughter

We must further state that disbelief, followed by ribald laughter, came at precisely the points we expected: the jokey alternative answers. And lastly, not one of our test groups failed to spot the error we instanced earlier, after being initially puzzled by its appearance.

Quite a few of our people also asked why the subject had been entrusted to computer-aided instruction. "Anyone who can use a computer, or understand how to after being shown, isn't likely to be so unsophisticated as to need that sort of stuff!" a 17-year-old boy and a 37-year-old woman said independently of each other.

And that surely is the point: computer-aided instruction merits the expense involved in setting it up when three criteria are satisfied. First, when the computer element is genuinely instructional. Second, when the instructional element could not be better done than by a computer. Third, when the expense involved in setting it up (and acquiring it) are justified.

On all three counts, we feel this Vitafacts program fails, and fails badly. We don't know about other programs in the series - we haven't seen them. The computer element in this one, however, consists of three relatively expensive but low-quality quizzes, with mere traces of instruction.

So we're forced inescapably to our final conclusion. Personal Software are known for the quality of their programs. To maintain that reputation, it appears they might reasonably have used some form of birth-control on that reviewed here.

T.H.

Browsing Basic by Jim Butterfield

There's been correspondence in PRINTOUT lately about how to find where a particular line of Basic resides in memory. The best way is to use the Machine Language Monitor and track the Basic chain through to the line you want. But for those who don't have a Monitor, or don't know how to use it, or can't read hexadecimal numbers, or don't feel like doing it that way - there is another way. Basic direct commands can be quite powerful, if you get the trick of using them.

First clear the screen on the PET. (These cosmetics are not really needed, but they make things easier).

In the middle of the screen, type: A=1025 : B=256 followed by a RETURN. Now, HOME to the top of the screen. Type in the following as a single line - I show it on several lines for easy readability:

```
C=A:
 A=PEEK(C)+B*PEEK(C+1):
  L=PEEK(C+2)+B*PEEK(C+3):
   ?C;"left";A-1;"left/L=";L;"left...."
```

Type the cursor-left key where 'left' is shown. Now, if you've done it right, a few things will print when you press RETURN.

You'll see: where the first line of Basic starts, where it ends, and the Basic line number. For example, you might see something like 1025 1049/L= 10 which tells you that line 10 goes from 1025 to 1049 in memory. The first four locations are internal Basic information (two for the chain, two for the line number); the rest is a "tokenized" version of the Basic line.

Here's where the cosmetics come in handy. Press HOME and RETURN, and the location of the next Basic line will be reported to you. Do it again, and you get another line. Eventually, you will go past the end of your Basic program, and you'll get a nonsense line like: 2143 -1/L=3874 ... which signals that you're at the end.

Once you've found the line you're looking for, you can dig in and look at it or change it. If line 370 comes out as: 1325 1336/L=370 you can then type: FOR J=1329 TO 1336 : ?PEEK(J); : NEXT J. Note that we've skipped the first four locations.

You may get something like: 129 88 178 48 164 49 48 0, and can then scratch your head as to how a simple line like FOR X= 0 TO 10 can change into such gibberish.

But that's another story.

Peeks & Pokes

by Inside Trader

Spencer's Revenge: Computer journalists lured to Commodore's subterranean press lunch by promises of an inducement (they were hoping for a VIC), were astonished to be presented with a bottle of champagne bearing the legend "Very Old, Very Genuine Chateau Commodore". They should have read on before drinking. According to the small print the contents of each bottle had been "personally passed by Kit Spencer".

Knackered. I fear for the safety of Ron Geere who was unwise enough to publicly question the veracity of Persoft's Matthew Wauchope. Writing under the pseudonym 'NMI' in the IPUG Newsletter, Ron published an "investigation" of a row between Petsoft and one of its authors. Unfortunately he didn't bother to ask the company for their side of the story. Now the improbably named Wauchope, who is an enthusiastic Special Constable, is hoping that Ron will be able to assist him with *his* enquiries.

In the money: Commodore's technical department are running a book on who will be next to leave the company. Having collected on the departures of Chuck Peddle and Chris Fish, the hot money is now running on U.K. Software Manager, Mike Whitehead, recent recipient of offers from Professional Software and the Bristol Software Factory. Whitehead, whose close resemblance to Diana Dors has previously been noted in this column, denies he's leaving. "It's just a plot to screw more money out of Kit" he grins.

Talking of Messrs. Peddle and Fish, I predict that they will shortly set up in business together. Chuck has long nursed the ambition to build a programmable vacuum cleaner. The Fish will hawk the finished product from door-to-door.

HB sauce. On a visit to the Kettering Komandantur of Colin 'Cheeky' Stanley, I notice a large trunk affixed to the wall of the technical department. This, it emerges, is the famous swear box that has so helped HB's cash-flow. Chief contributor, needless to say, is the Cheeky Chappy's long-suffering partner, Mike Hambly.

Jack the Ripper: The latest project to fall victim to Jack Tramiel's ever-ready axe is the Commodore speech synthesiser based on the Votrax unit. However, I learn that an independent company is secretly pushing ahead with a system employing National SemiConductor's Digitalker chip. Those blessed with more curiosity than sense can telephone 0101-408-737-3939 and hear a demonstration.

The Editor has installed a spanking new telephone answering system with speech synthesis and voice activation. It's called KIT. Why KIT? Because it always has the last word.

Action Man: I hear that the brothers Bailey of Camden Electronics have been boasting of their success in flogging a PET to the Palace. We, on the other hand, are too discreet to disclose the identity of our Royal reader.

Remember you read it here first: Sources close to Commodore's financial backers tell me the company's founder, Jack Tramiel, will leave within three months. I will warrant it won't be without a fight.

SUPAman Howard Pilgrim has asked me to draw a veil over the bachanalian events which led to the Southern Users of PET Association being banned from holding further meetings in the showrooms of Brighton dealer, Amplicon. However, if anyone has a large, water-proof room with padded walls, Howard would like to hear from them.

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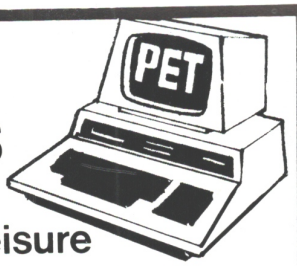

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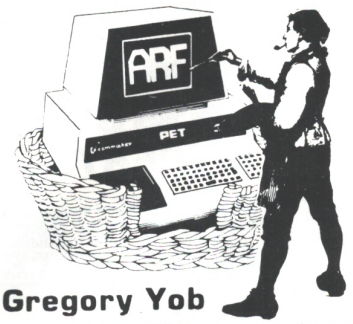

by Gregory Yob

ENTER THE STRINGY FLOPPY!

The Stringy Floppy

Stringy Floppy is a miniature cassette tape drive which can load and save programs about 10 times faster than the PET's tape unit. Well, Exatron asked me if I could produce a version of the Stringy Floppy for the PET, and the last few months were fully occupied by this.

I will now describe to you the capabilities of the PET Stringy Floppy.

The Stringy Floppy comes in a case about 6" x 4" x 3" with a ribbon cable leading to a small 2" x 3" card which plugs into the PET's User Port. The card has extension fingers to permit other User Port devices, including other Stringy Floppys up to a total of four tape drives. Jumpers inside the Tape Drive's case are used to set the drive number from 0 to 3. (0 is the default drive number.) A small transformer unit similar to those used for calculators leads to the 110v wall socket for power.

The tape cassettes are called "wafers" and are about the size of a business card and ⅛" thick — this is a very compact size, and many users store their wafers in the plastic binder inserts used for business cards. Wafers come in different lengths, from 5 feet to 50 feet in length. An 8K program will fit on a 10 foot wafer. (This is a true 8K, not the 7167 bytes free). Physically, the tape runs at about 10ips, and an 8K program will be loaded in under 15 seconds.

Also provided with the unit is a 2K ROM which plugs into the $9000 slot in the PET's ROM. (Various other methods of attaching ROMs are available — if you can put a Programmer's Toolkit on the PET, you can mount the Stringy Floppy ROM.)

Once you are set up per the User's Manual, starting the Stringy is simple — a SYS 36864 does the trick. A sign-on message appears, and the Stringy is now "wedged" into the PET, that is, all Stringy Floppy commands can be executed directly or as part of a Basic program. Let's look at the commands:

@END — This is the "rewind" function for a wafer. Stringy wafers are endless tapes with an end marker. @END will run the tape at Fast Forward and leave the tape positioned just following the end marker. If you have more than one tape unit, @END 1, @END 2, and @END 3 will apply to these. (The same convention is true of all other commands.)

@NEW — This "formats" a wafer. Since most wafers come with a test pattern on them, @NEW isn't really needed — however, it is a good way to erase an old wafer.

@LIST — Since several programs may be stored on a wafer, this provides the "directory" function. The wafer is rewound and then scanned for file headers. The filename and filetype (Basic, 6502 or DATA) are shown, and the wafer stops just after the end marker. @LIST may be given two parameters, drive number, and any number (i.e., @LIST 0,1) to only show the files remaining on the tape.

@LOAD — To load a program, @LOAD will look for a fileheader and then load the program. Files may be named in *exactly* the same way as normal PET tapes and will be searched for in *exactly* the same way. For example, @LOAD "FOOTBALL",2 will look for "FOOTBALL" on Drive #2.

@RUN — This performs the "load and go" function of loading and then executing the program. @RUN is permitted in Basic programs and will perform the "chaining" functions of the PET's LOAD. If the new program is larger than the current program, the message "OVERFLOW" will point this out. @RUN will also load and execute machine language programs.

@SAVE — In normal use, @Save willl save your Basic program in the usual manner. For machine language, you can specify the addresses in either decimal or hexadecimal, and if you want, the starting address as well. Some examples will clarify this:

@SAVE "MUGWUMP" — Saves MUGWUMP on Drive #0 as a Basic program.

@SAVE "MEM TEST",0,1024,2400 — Saves MEM TEST as a 6502 program from addresses 1024 to 2399 in decimal.

@SAVE "CRIT PATH",1,$2000, $2200,$2100 — Saves CRIT PATH from hex $2000 to hex $2200, with program start at $2100 (hex).

If no starting address is given, the first save address is used instead.

@THEN — In normal use, error messages like "FILE NOT FOUND" are printed on the screen and the program halts. @THEN provides four options for error messages:

0 — Show error & halt program.
1 — Don't show error & do halt program.
2 — Show error & continue running program.
3 — Don't show error, keep running.

@THEN will not stop normal Basic messages like SYNTAX ERROR and their effects — only Stringy errors are handled. To detect errors when you want to keep running, the Basic "status" variable is set by an error to a value from 1 to 8 to indicate which error is present.

@VERIFY is the last command and performs the normal VERIFY function for programs.

One important detail — all numbers and strings allow *any* Basic expression instead, for example,

```
@SAVE A$+".EXT",A+7,
     42*SIN(3.8),$55
```

is a legal command. One exception — hex quantities can't be expressions (which won't bother anybody I know . . .)

If you wish to abort an operation, pressing the RUN/STOP key will do the trick in all cases with a BREAK IN xxx message.

In about 6 months, a "Level II" version will arrive with these additional commands:

@DEF — Define data buffer storage areas.
@PRINT# — Print sequential data.
@INPUT# — Read data.
@GET# — Read one character.
@OPEN — Define a data file (one per drive unit).
@CLOSE — Undefine a file & write last buffer to tape.

The Stringy Floppy is pretty nifty — I hope you like it.

A Phonetasy

If you look at a telephone dial, some of the numbers also have letters too. For example, 266-7883 can be dialed as COMPUTE. An interesting exercise is to find out which combinations of letters correspond to your phone number. Some numbers are easy to do — and others, like mine, are quite difficult. The program below provides an exhaustive list of the letter combinations for a 7 digit phone number. When I searched my list, my phone number became FANIZEY.

```
10 PRINT"clr PHONE NUMBER WORDS
20 PRINT"clr WILL PRINT A LIST OF THE
   POSSIBLE
30 PRINT"LETTER COMBINATIONS FOR YOUR
40 PRINT"TELEPHONE NUMBER.
50 OPEN 4,4
60 PRINT#4,CHR$(30)
70 PRINT#4,"PHONE WORDS FOR: sp";
80 DIM D$(9),D(9),P(7),W$(7)
90 FORJ=ØTO 9: READ D$(J): D(J)=LEN
     (D$(J)):NEXT
100 DATA ØZ,1,ABC,DEF,GHI,JKL,MNO,
     PQRS,TUV,WXY
110 INPUT"dn dn YOUR PHONE NUMBER
     DDD-DDDD";P$
120 REM GEN A STRING
130 IF LEN(P$)<>8 THEN 110
140 IF MID$(P$,4,1)<>"-" THEN 110
150 PRINT#4,P$: PRINT#4
160 P$=LEFT$(P$,3)+RIGHT$(P$,4)
170 FOR J=1 TO 7
180 P$(J)=ASC(MID$(P$,J))-48
190 NEXT J
200 PRINT P$
210 REM MAKE A WORD
220 FOR A = 1 TO D(P(1))
230 W$(1)=MID$(D$(P(1)),A,1)
240 FOR B = 1 TO D(P(2))
250 W$(2)=MID$(D$(P(2)),B,1)
260 FOR C = 1 TO D(P(3))
270 W$(3)=MID$(D$(P(3)),C,1)
280 FOR D = 1 TO D(P(4))
290 W$(4)=MID$(D$(P(4)),D,1)
300 FOR E = 1 TO D(P(5))
310 W$(5)=MID$(D$(P(5)),E,1)
320 FOR F = 1 TO D(P(6))
330 W$(6)=MID$(D$(P(6)),F,1)
340 FOR G 1 TO D(P(7))
```

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```
350 W$(7)=MID$(D$(P(7)),G,1)
360 W$="":FORJ = 1 TO 7: W$=W$+W$(J):
    NEXT
370 PRINT W$
380 PRINT#4,W$" sp ";
390 NEXT G,F,E,D,C,B,A
400 PRINT#4
```

The program asks for your number in the form DDD-DDDD, turns on the printer, and then fills about six pages with possible combinations of letters for your number. If you don't have a printer, make these changes:

Lines 50,60 — delete.
Line 70 — change the PRINT#4, to a PRINT.
Line 110 — change to line 50, delete the old line 110.
Line 150 — change PRINT#4, to PRINT (two of them).
Lines 130,140 — change THEN 110 to THEN RUN.

Then enter these lines:

```
370 PRINT W$"sp";
380 T=T+1:IF T>89 THEN 400
395 END
400 PRINT:PRINT"PRESS KEY TO CONTINUE"
410 GETA$:IFA$=""THEN 410
420 T=Ø:GOTO 390
```

In Line 80, array D$ holds the letters for each digit 0-9. The array D holds the number of letters in each case — some values, like 1, only hold one letter (I use "1" since there aren't any letters on the phone dial for "1") and most hold three letters. The array P holds the individual digits of the phone number, which are computed in Line 180. The preceding lines check the phone number string P$ for gross errors and remove the "-" character.

Lines 220 through 350 comprise a gigantically nested FOR-NEXT loop which goes through each possible letter combination. The rightmost digit is the innermost loop, so the letter combinations end up printed in alphabetical order. The letters are accumulated in the array W$ and combined into the string W$ in Line 360, and printed in Line 380.

The changes for non-printer owners remove the PRINT#4 lines and pauses the display every 90 combinations to permit your inspection of them. Note that Line 390 terminates all of the loops in one NEXT statement.

Below is a short sample of my printer's output for this program to give you an idea of what to expect.

```
PHONE WORDS FOR: 326-4039

DAMGØDW DAMGØDX DAMGØDY DAMGØEW DAMGØEX DAMGØEY DAMGØFW DAMGØFX DAMGØFY DAMGZDW
DAMGZDX DAMGZDY DAMGZEW DAMGZEX DAMGZEY DAMGZFW DAMGZFX DAMGZFY DAMHØDW DAMHØDX
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DANIØDW DANIØDX DANIØDY DANIØEW DANIØEX DANIØEY DANIØFW DANIØFX DANIØFY DANIZDW
DANIZDX DANIZDY DANIZEW DANIZEX DANIZEY DANIZFW DANIZFX DANIZFY DAOGØDW DAOGØDX
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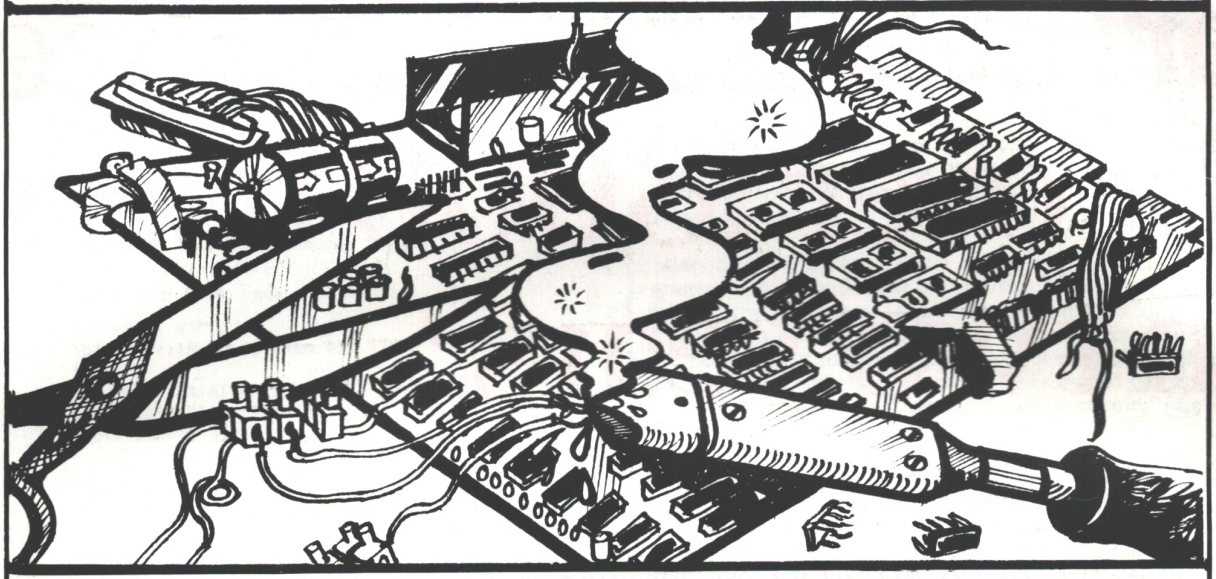

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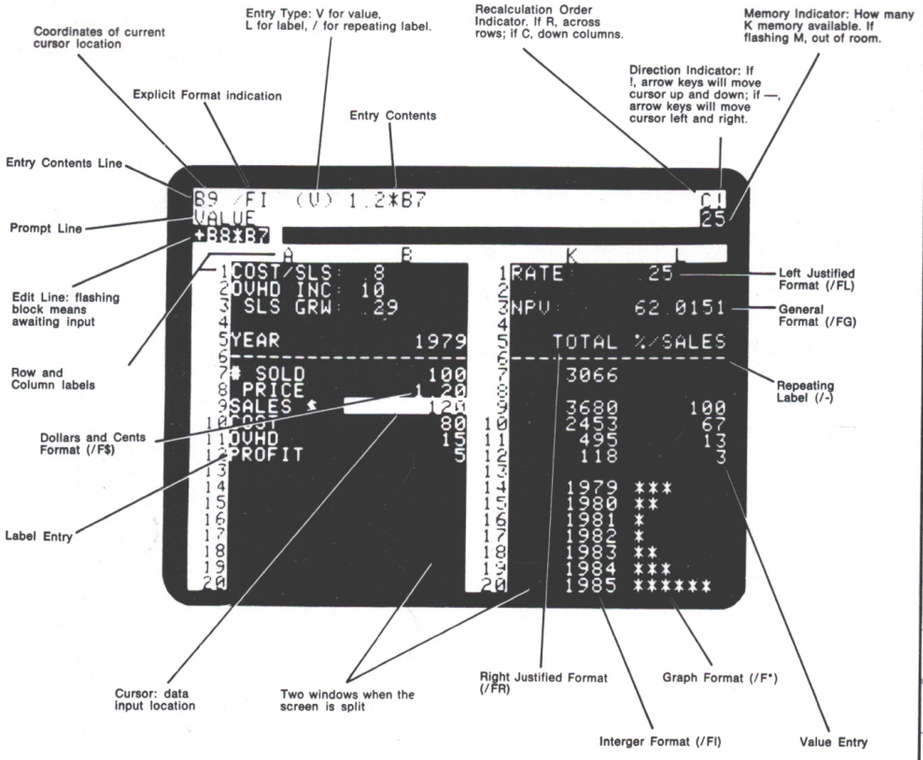
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